CAUSES OF ROOF-FALL FATALITIES IN ANTHRACITE AND BITUMINOUS-COAL MINES, 1955 AND 1956

BY R. D. JOSEPH

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SUMMARY

This report deals exclusively with roof-fall accidents that occurred during 1955 and 1956 in both anthracite and bituminous-coal mines throughout the United States. The report stems from a cooperative study conducted by the Bureau of Mines and the Roof-Control Committee of the Coal-Mining Section, National Safety Council. The study includes an analysis of individual accident reports, sets forth the measurable factors, and compares such factors with a representative sample of average data from 39 anthracite mines and 117 bituminous mines (appendixes A and B). Particular emphasis is placed on fatal roof-fall accidents with respect to their causes, locations, and the methods of support used at the point of occurrence.

INTRODUCTION

The purpose of the report is to classify all measurable details of the occurrences of roof-fall fatalities so that the material presented will assist those promoting safety and will serve as a manual for those whose principal duty is inspection of mines.

ACKNOWLEDGMENTS

Acknowledgment and appreciation are hereby voiced to members of the National Safety Council and of its Coal-Mining Section Roof-Control Committee for their interest and cooperation. The author also thanks member coal companies for submitting their records to be included as part of this report. He is particularly grateful to the chairman of the Roof-Control Committee of the Council's Coal-Mining Section for his assistance in preparing this report.

GENERAL DISCUSSION

As a result of accidents in and around coal mines during 1955 and 1956, 862 men lost their lives; of these, 737 were lost underground. Four hundred and fifty-four men were fatally injured, due to falls of roof, rib, or face. Falls of roof, rib, or face comprised 53 percent of the total fatal accidents and 62 percent of those that occurred underground.

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The percentage of accidents chargeable to falls of rock and coal is not by any means disproportionate to the hazard and the exposure when compared with other mine dangers. All men who enter mines are constantly subjected or exposed, while underground, to the hazard of rock falls. However, the occurrence of 454 roof-fall fatalities in less than the same number of mines is wholly disproportionate in comparison with the results achieved in more than 8,000 other mines where roof-fall fatalities did not occur.

The occurrence of 454 deaths in both large and small mines that have normal conditions is an inexcusable situation in the light of the facts disclosed in this report; these facts substantiate the following conclusions:

(1) 454 deaths occurred; all resulted from some type of failure and could have been prevented had an adequate roof-supporting system been used systematically as part of the mining system.

(2) Failure by individuals - men and officials - to conduct themselves competently in the performance, control, and direction of the work was the major contributing factor.

(3) Such failure emerges as the responsibility of the face supervisor if and when he is invested with proper authority.

(4) Supervisory failures either result from lack of experience and training, incompetence in assuming responsibility, and lack of initiative or force to carry out the duties inherent in the job; or the area of assignment is too large to permit adequate supervision by the official.

TABLE 1. - Falls of roof, rib, or face[1]

	Accidents		Frequency[2]	
	Fatal	Nonfatal	Fatal	Nonfatal
Anthracite				
1955	31	292	0.73	6.86
1956	31	480	.67	10.45
Bituminous coal				
1955	185	2,691	0.49	7.19
1956	207	2,817	.58	7.85

[1] Data preliminary - subject to change.
[2] Per million man-hours exposure.

DISCUSSION

The number of fatal and nonfatal roof-fall, lost-time accidents occurring in the industry needs no particular emphasis. The actual figures, as indicated in table 1, sufficiently underscore the importance of preventing such accidents. Six thousand, seven hundred thirty-four (6,734) men - approximately 3 percent of the average number employed during the 2 years under study - died or suffered lost-time injuries from falls of roof, rib, or face. About 6-1/2 percent of the total injuries resulted in death, a percentage which is only relative in that a fatal injury and a nonfatal injury represent degrees of severity. The degree of severity in many instances is altered by the chance location of equipment, the physical fitness or the physical agility of the individual involved, and the rapidity and effectiveness of medical assistance. For instance:

Case 1. A miner suffered only a lost-time injury instead of possible death because a machine he was operating prevented his body from being crushed.

Case 2. Instinctively sensing a rock fall was about to occur, a miner sprang toward safety. His legs were broken, but his body was spared.

Case 3. This miner, a rugged 27-year-old, was caught under a fall of rock. His body was badly crushed, his spine was fractured, and he suffered shock followed by pneumonia, yet he lived because his physical makeup and modern medical science helped him withstand this terrible ordeal.

Such happenings lessen only the seriousness of the injury, leaving the occurrence of the roof or rib fall to stress the important need of systematic support.

Table 1 shows the frequency of nonfatal lost-time and fatal roof-fall accidents in the anthracite and bituminous-coal industries during 1955 and 1956. A rise in frequency is noted for lost-time roof-fall accidents in both divisions. The anthracite industry experienced 12.5 percent of the roof-fall accidents in producing approximately 5.3 percent of the combined tonnage, significantly pointing to a more complicated support problem or to insufficiency of the support systems and their application.

Roof and rib-fall accidents, common to the mining industry, are sometimes regarded as necessary byproducts of the work or even as unavoidable. An examination of the initial causes, as shown in table 2, should erase this erroneous concept.

TABLE 2. - Initial causes of roof-fall fatalities

	Fatal roof- or face-fall accidents
Failure to take down or secure known loose roof................	139
Failure to examine or failure in examination...................	125
Failure to use temporary support inby the permanent support....	37
Failure to comply with the support system......................	29
Failure to replace dislodged support...........................	26
Failure to abandon place.......................................	26
Failure to take ordinary precautions...........................	19
Failure of the support system..................................	18
Failure or inadequacy of the roof-bolting plan.................	15
Failure to follow company rules or instructions................	9
Failure to heed warning signs..................................	7
Failure of the mining system to provide adequate support.......	2
Failure to provide temporary support while setting timbers.....	1
Failure to secure before removing timbers......................	1
	454

Causes listed in table 2 show that all the fatal accidents were brought about by failure, either of the individual exposed or of someone who either bungled in planning or in directing and controlling the work.

Predominating among the causes are:

Failure to take down or secure loose roof.

Failure to examine or failure in the examination.

Failure to use temporary support.

Failure to comply with the support system.

These are responsibilities that are definitely those of the individual employed at the working face, yet these, as well as those embodied in such failures as:

Failure to replace dislodged timbers,

Failure to abandon a dangerous place, and

Failure to take ordinary precautions,

stem from improper supervision. When mine standards are not maintained and work habits demonstrate a disregard for safe practices, a lack of training and disciplinary control is reflected.

Failure of the support system and

Failure of the mining system to provide adequate support

are responsibilities of management and engineering. Failure of this type usually originates in pillar mining, where the size of pillar and roof spans must be well controlled.

The record of anthracite mines, and that of all small mines employing 14 men or less underground, has, to some degree, as shown in table 3, adversely affected the record for all mines.

Mechanization, such as mechanical loading and continuous mining, which may be expected to increase the frequency of accidents, is not a factor in either of the last-named groups. In general, these mines use conventional wooden supports, and the workings are not concentrated, causing supervision to consist of only periodic visits by officials. Therefore, more dependence is placed on miners and upon the ability of supervisors to exercise control of the work when absent from the place.

Accidents in general, and roof-fall accidents in particular, reflect clearly the extent of supervision or the enforcement of State and Federal requirements regarding the support of working places.

Most State mining laws require that the working place be adequately supported by the miner, and the mine foreman is required to see that this provision is enforced. Provision for the supply and delivery of support is also a responsibility of management.

Federal requirements, as stated in sec. 209(c) of The Federal Coal Mine Safety Act, state specifically that: The roof and ribs of all active underground roadways and travelways in a mine shall be adequately supported to protect persons from falls of roof or ribs.

TABLE 3. - 1955 and 1956 roof-fall fatal accidents

2-year summary

Month	No. of all fatal accidents	No. of roof-fall fatal accidents	Roof-fall fatal accidents		Roof-fall fatal accidents	
			Anthracite	Bituminous coal	Title I mines1/	Title II mines2/
January..	96	51	8	43	13	38
February.	78	44	10	34	9	35
March....	63	42	6	36	9	33
April....	68	37	7	30	6	31
May......	71	42	6	36	11	31
June.....	73	29	5	24	9	20
July.....	80	42	4	38	11	31
August...	72	34	2	32	10	24
September	68	37	6	31	10	27
October..	75	41	4	37	9	32
November.	57	32	2	30	5	27
December.	61	23	2	21	6	17
	862	454	62	392	108	346
Percent of total.....		53.				
Percent of roof-fall fatality total.....................			13.5	86.5	22.2	77.8

1/ Employ less than 15 men underground.
2/ Employ 15 men or more.

In the Federal Mine-Safety Codes for Anthracite and Bituminous-coal Mines, the support requirements are broadened by three provisions:

1. Supports knocked out accidently shall be replaced promptly.

2. Permanent supports in active working places shall not be removed unless equivalent protection is provided.

3. Where roof supports are required at the working faces, persons shall not advance beyond artificially supported roof, except those who are assigned to install supports or inspect the place.

Violation of these regulations is found in virtually all fatal roof-fall accidents. The Federal Bureau of Mines has no power to enforce the provisions regarding working places; however, violations of the Codes in this particular sphere can be cited and enforced unilaterally under existing agreements between labor and management. All State mine inspectors in States where anthracite and bituminous coal are produced have enforcement powers. All States similarly require inspection of all mines at least once every 4 months by State inspectors. State inspection agencies also have access to reports by Federal inspectors.

Table 4 shows roof-fall fatalities by Federal Bureau of Mines districts and by States for the 2-year period. District C had 261 of the 454 roof-fall fatalities. West Virginia, Kentucky, and Virginia reported 270 of the total during the same period. These States produced approximately one-third of the Nation's bituminous coal, yet had 59 percent of the roof-fall fatalities during the reporting period.

TABLE 4. - 1955 and 1956 Roof-fall fatal accidents, by States and Federal Bureau of Mines inspection districts

Inspection district	States												Total
	Pa.	Ohio	W. Va.	Va.	Ky.	Ala.	Tenn.	Ill.	Ind.	Colo.	Utah	Wyo.	
A.............	62	-	-	-	-	-	-	-	-	-	-	-	62
B.............	54	7	-	-	-	-	-	-	-	-	-	-	61
C.............	-	-	150	42	69	-	-	-	-	-	-	-	261
D.............	-	-	-	-	-	14	10	-	-	-	-	-	24
E.............	-	-	-	-	9	-	-	19	2	-	-	-	30
F.............	-	-	-	-	-	-	-	-	-	-	-	-	0
G.............	-	-	-	-	-	-	-	-	-	-	-	-	0
H.............	-	-	-	-	-	-	-	-	-	7	6	3	16
Total....	116	7	150	42	78	14	10	19	2	7	6	3	454

Table 5 reveals that 48.8 percent of the roof, rib, or face-fall fatal injuries were in hand-loading areas. This reflects, as does table 3, that occurrences are more frequent in mines that are not fully mechanized. This 2-year rate is contrary to the trend of increased mechanization within the mining industry. Mechanical mining and loading yielded 83 percent of the combined underground output of anthracite and bituminous coal. These facts lead to the conclusion that 48.8 percent of roof, rib, or face-fall fatal injuries happened in nonmechanized areas that produced only 17 percent of the coal. Associating this conclusion with the initial causes as listed in table 2, it is obvious that a large percentage of the failures could be eliminated by more rigid control of planning, training, and supervision in such areas.

TABLE 5. - 1955 and 1956 roof- , rib- , or face-fall fatal injuries:

Distribution

Method of mining - height of bed - proximity to face - condition of mining

	No. of roof-fall fatalities	Percent
Method of mining and loading:		
Hand loading..................................	222	48.8
Mechanical mining and loading................	213	47.0
Continuous mining............................	19	4.2
Height of bed:		
Under 30 inches..............................	10	2.2
Over 30 inches and under 41 inches...........	100	22.0
Over 42 inches and under 59 inches...........	147	32.3
Over 60 inches...............................	197	43.5
Location:		
Within 25 feet of face.......................	349	77.0
At face but over 25 feet away................	50	11.0
Away from face area..........................	55	12.0
Condition of mining:		
Solid mining.................................	303	67.0
Pillar mining................................	151	33.0
	454	

Table 5 shows localities where fatal roof-fall accidents have occurred. It reveals that 399 (88 percent) were within the face area. This area cannot be strictly defined; however, these 399 accidents include those involving men who were employed on production work and were so engaged near the face and under the face supervisor's control at the time of the mishap. Seventy-seven (77) percent occurred within 25 feet of the face and 11 percent in face areas outby, such as entry haulways, crosscuts, and loading-machine heads.

Over half of the roof-fall fatalities were at mechanical-mining faces or under a condition of more or less constant supervision. This can be deduced from table 5, which shows that 399 occurred within the face zone and 51.2 percent of all accidents in mechanized sections. Virtually all mechanized mines have full-time face supervision. The foregoing facts invite an investigation of the effectiveness of supervision in the individual mines where roof-fall fatalities are happening. It is quite evident that more training should be applied to examining the face area and explaining how work at the face should be controlled.

Timbering Compared With Roof Bolting

Eighty-four (84) percent of 1955 and 1956 fatalities from roof falls were in mines using timbering. On the other hand, 16 percent were in mines using roof bolts as an exclusive means of support or as a supplement to timbers (table 6).

Roof bolting, now a widely accepted practice in bituminous-coal mines, was introduced to that industry in 1947. Bolting now is employed in over 600 bituminous-coal mines in producing over half of the Nation's bituminous coal. Bolting has not been generally adopted in anthracite mines, although it is used in a few to supplement timbering. The extent to which roof bolting is used as sole support and as a supplemental support is shown in appendix A of this report.

The relative merit and usefulness or importance of roof bolting to the industry are measured by the fact that bolting has paved the way for highly mechanized systems of mining and has permitted economical, safer recovery of coal previously considered unminable. The effectiveness of roof bolting as a support is well reflected in the record shown in table 6: Only 73 of 454 fatal accidents were in areas of mines where bolts were used. The record further shows that 58 of these mishaps cannot be charged to the support or the system. In seven cases the roof-bolting plan was not followed; pillar falls, falls of rib, unsupported brows, and men working beyond the bolted area make up the balance of causes.

The fact that roof bolts can be installed close to the coal face and in overhanging brows where conventional timber cannot be used conveniently is extremely important in preventing roof falls. Equally important to the industry is the fact that roof bolts allow space for operating equipment.

Intersections

Intersections, which constitute over 30 percent of the underground excavations in coal mines, had a direct influence on the roof- , rib- , or face-fall fatality rate during the 2-year period. This applies especially when the bituminous-coal segment of the industry is considered, where wider turnouts and longer roof spans accompany mechanization.

TABLE 6. - 1955 and 1956 roof- , rib- , or face-fall fatal injuries:

Occurrence relative to support

	No. of accidents	Percent of total
Occurred beyond support line....................	191	42.0
Occurred within supported areas................	263	58.0
Total....................................	454	100.0

Type of support

	No. of accidents	Percent of total
Occurred in bolted areas........................	35	7.7
Occurred in timbered and bolted areas..........	38	8.3
Occurred in timbered areas......................	381	84.0
Total....................................	454	100.0

Fatal accidents that occurred in areas where roof bolting was used as support or supplemental support

Caused by:	
Broken bolts...	2
Anchorage failure....................................	4
Bolts of insufficient length.........................	5
Inadequate bolting plan..............................	4
Plan not followed....................................	7
Pillar falls...	3
Temporary support removed............................	1
Lack of temporary support and beyond bolts..........	40
Falls of brow and rib unsupported....................	7
Total..	73

Intersections were the locale of 150 or 33 percent of the roof, rib, or face-fall fatalities (table 7). One hundred nineteen (119) of these were in the face area; 88 were within 25 feet of the working face. Most deaths at intersections occurred during the period when the turnout was either being turned or driven. This again emphasizes the need for support plans fitted to the method of development, and it further substantiates the statement that systems of support currently in use in some mines are unreliable for supporting the increased roof span at turnouts.

The number of roof-fall accidents that occurred at intersections in mines using roof bolts is considerably lower than in mines using timber as support. As table 7 shows, a total of 23 (15 percent) occurred in mines using bolts and timber, compared with 85 percent where timber alone was used. It is demonstrated in many mines that roof bolting can be used to reinforce the rock. Bolting is an effective measure in reducing roof, rib, or face-fall injuries if applied systematically and installed as closely as possible to the new face before undermining is begun.

TABLE 7. - 1955 and 1956 roof- , rib- , or face-fall injuries:

Intersections

	No. occurring	Percent of total
At intersections	150	33
Type ⊥ intersections	78	52
Type V intersections	18	12
Type X intersections	54	36
Anthracite mines	8	5
Bituminous-coal mines	142	95
Title I mines	27	18
Title II mines	123	82
Continuous mining	3	2
Mechanical loading	95	63
Hand loading	52	35
Pillar	22	15
Solid	128	85
Roof bolted	14	9
Timber and roof bolts	9	6
Timbered	127	85
Face area:		
Within 25 feet of face	88	60
Over 25 feet from face	31	20
Away from face area	31	20
Height of seam:		
30 inches and less	5	3
31 to 41 inches	28	19
42 to 60 inches	54	36
60 inches and more	63	42

RECOMMENDATIONS

Application of the following recommendations will raise the standards of accident prevention in anthracite and bituminous-coal mines:

1. The adoption and enforcement of support plans that minimize the width of the place supported, the distance between supports, and the distance from the supports to the working face.

2. The workload of foremen and assistant foremen should be so regulated as to allow enough time for a thorough examination of the working places and instruction of the workmen.

3. Qualities of leadership and teaching ability should be stressed in training foremen and be a requirement in their employment.

APPENDIXES

Appendixes A and B in this report contain information obtained by the Roof Control Committee, Coal-Mining Section, National Safety Council. The tabulations are for 39 of the anthracite mines and 117 of the bituminous-coal mines that experienced roof-fall accidents in 1955 and 1956. The tabulations show methods of mining, roof conditions, methods of support, and localities where the accidents occurred.

1. State	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania
2. Mine	"D1"	"D2"	"D3"	"D4"	"D5"	"D6"	"D7"	"D8"	"D9"	"D10"
3. Coal seam	Anthracite Mammoth	Anthracite Primrose Mammoth	Anthracite Primrose	Anthracite Bottom Pittston	Anthracite Dunmore	Anthracite Mammoth	Anthracite Wharton	Anthracite Mammoth	Anthracite Lykens Valley	Anthracite Holmes
4. Thickness of coal seam	50' to 60'	10' to 12' 50' to 60'	8'	34"	4.5'	30'	5' to 10'	40'	4.5'	4.5'
5. Immediate top	Slate	Flaky rock	Shale	Sandslate	Slate	Sandstone	Slate, clod, or sandstone	Sandstone	Rock to hard slate	Soft slate
6. Secondary top	Hard sandstone	Sandstone	Sandstone	do.	Sandstone	do.	Sandstone	Sandslate	Conglomerate rock	Sandstone
7. Type of bottom	do.	do.	do.	Sandstone	do.	do.	do.	Sandstone	Hard slate	Hard slate
8. Overburden:										
(a) Maximum	1,240'	850'	-	120'	274'	1,000'	400'	1,000'	285'	200'
(b) Minimum	833'	250'	-	100'	224'	20'	200'	20'	8'	-
(c) Average	1,036'	550'	-	110'	249'	500'	300'	500'	200'	125'
9. System of mining	Chutes and breasts	Chutes and breasts	Chutes and breasts	Chamber-and-pillar	Chamber-and-pillar	Pillar chute	Breasts	Room-and-pillar	Breast and pillar	Breast-and-pillar
10. What percentage of coal is mined on development or advance work?	14	40	50	60 to 70	None	10	80	35	5	60
11. Size of pillar in:										
(a) Entries	60'	60'	50'	20'	-	30' to 50'	-	30' to 50'	30'	36'
(b) Rooms	18' and 24'	18' to 24'	30'	20'	25'	36'	10'	36'	15'	20'
(c) Retreat mining	36'	36'	30'	10'	25'	36'	-	24'	15'	8'
12. On what centers are:										
(a) Entries	60'	60'	50'	50'	-	30' to 60'	-	30' to 60'	30'	150'
(b) Rooms	60'	18' to 24'	-	50'	50'	60'	50'	60'	60'	20'
(c) Breakthroughs	55'	60'	-	-	50'	60'	60'	60'	30'	60'
(d) Pillar mining	36'	55' to 60'	-	50'	50'	-	-	-	-	-
13. Pillar mining:										
(a) Complete extraction	-	-	Complete extraction	-	Complete extraction	Complete extraction	-	Complete extraction	Complete extraction	-
(b) Partial extraction	Partial extraction	Partial extraction	-	Partial extraction	-	-	Partial extraction	-	-	Partial extraction
14. Width of places:										
(a) Entries	6' x 6' chutes	6' x 6'	12'	18'	-	12'	12'	12'	15'	12'
(b) Rooms	18' x 24'	18' to 24'	16'	30'	25'	24'	24'	24'	-	20'
(c) Breakthroughs	5' x 5'	5' x 5'	6'	16'	10'	6'	6'	6'	8'	6'
(d) Open-end cutovers	-	-	-	-	-	-	-	-	-	-
(e) Pocket and wing:										
1. Pocket	-	-	-	-	-	8'	-	-	-	-
2. Wing	-	-	-	-	-	-	-	-	-	-
15. Roof bolting - concurrent or subsequent to face mining?	-	-	-	-	-	-	Concurrent	-	-	-
(a) Timbering concurrent or subsequent to face mining?	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent
16. Roof-support development:										
(a) Bolts	-	Bolts	-	-	-	-	Bolts	-	-	-
(b) X-bars	X-bars	X-bars	-	X-bars	-	X-bars	-	X-bars	-	-
(c) Posts	Posts	Posts	Posts	Posts	-	Posts	Posts	Posts	Posts	Posts
(d) Bolts and x-bars	-	-	-	-	-	-	-	-	-	-
(e) Bolts and posts	-	-	-	-	-	-	-	-	-	-
(f) Self-supporting	Partial	Partial	-	-	-	-	-	-	-	-
17. Roof support - retreat mining:										
(a) Bolts	-	-	-	-	-	-	-	-	-	-
(b) X-bars	X-bars	X-bars	-	X-bars	X-bars	X-bars	-	X-bars	-	-
(c) Posts	Posts	Posts	Posts	Posts	Posts	Posts	-	Posts	Posts	Posts
(d) Bolts and x-bars	-	-	-	-	-	-	-	-	-	-
(e) Bolts and posts	-	-	-	-	-	-	-	-	-	-
(f) Self-supporting	Partial	Partial	-	-	-	-	-	-	-	-
18. Roof-bolt anchorage:										
(a) Massive rock	-	-	-	-	-	-	-	-	-	-
(b) Laminated shale	-	-	-	-	-	-	Laminated rock	-	-	-
(c) Coal	-	-	-	-	-	-	-	-	-	-
(d) Other	-	-	-	-	-	-	-	-	-	-
19. Do you have a standard roof-support plan?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20. If available, attach a roof-support plan	No	No	No	No	No	No	Attached	No	No	No
21. What percentage of accidents occurred from falls of roof, sides, or face?										
1955	6.2	6.6	5	30	None	3	25	5	2	-
1956	6.5	1.6	10	None	100	5	9	61	5	100
22. What percentage of roof-fall accidents occurred within 25 ft. of the working face?										
1955	66.5	100	-	100	-	67	-	100	100	-
1956	66.6	66.6	100	-	-	55	100	100	40	100
23. What percentage of roof-fall accidents occurred where the roof support plan was not followed?										
1955	-	-	-	100	-	-	-	-	-	-
1956	-	-	-	-	-	-	-	-	-	-
24. Where roof supports are used, what percentage of roof-fall accidents occurred inby last roof support?										
1955	66.6	16.6	-	100	-	-	-	100	-	-
1956	66.6	-	-	-	100	-	-	100	-	100
25. What percentage of roof-fall accidents occurred in -										
(a) Advance or development mining -										
1955	33.3	-	-	100	-	60	-	-	-	-
1956	33.3	100	100	-	-	55	-	-	-	-
(b) Pillar or retreat mining										
1955	66.7	-	-	-	-	40	-	100	100	-
1956	66.7	100	100	-	100	45	100	100	100	100
26. What percentage of roof-fall accidents occurred in the following areas?	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956
(a) Roof-bolted area	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
(b) Timbered area	100 100	50 50	100 100	100 100	- 100	100 100	- 100	100 100	100 100	- 100
(c) Combination timber and roof bolts	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -
(d) Self-supporting roof	- -	50 50	- -	- -	- -	- -	100 -	- -	- -	- -
27. Do you consider the roof-control plan or method adequate; if not, what do you recommend?	Special attention warranted at face area.	Special attention warranted at or near face area.	Plan appears to be adequate.	Plan appears to have shown results for better.	Pillar extraction warrants special attention.	Special attention required at or near face area.	Plan appears adequate.	Special attention warranted at working faces.	Recommend increased supervision.	Special attention warranted at face area.

1. State	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania
2. Mine	"E1"	"E2"	"E3"	"E4"	"E5"	"E6"	"E7"	"E8"	"E9"	"E10"
3. Coal seam	Anthracite Mammoth-Lykens	Anthracite Holmes	Anthracite No. 9-1/2 V.	Anthracite Mid-Split	Anthracite Hillman-Forge Ross-Lee	Anthracite Lykens #2	Anthracite 7' Vein	Anthracite Holmes	Anthracite Buck Mountain Mammoth	Anthracite Ross
4. Thickness of coal seam	Mammoth - 25' Lykens 5' to 15'	3' to 5'	5'6"	5' to 7'	3' to 16'	7'	6' to 7'	10'	15' - 25'	30" to 8'
5. Immediate top	Slate Conglomerate	6" slate Clod	Sandstone	Slate	Slate Sandstone	Slate	Black slate	Shale	Hard slate	Slate
6. Secondary top	Hard slate Conglomerates	Sandstone	do.	do.	Sandslate Conglomerate	Sandstone	-	Sandy shale	Sandstone	-
7. Type of bottom	Hard slate	Hard slate	Hard slate	do.	Sandslate; slate	do.	-	Sandstone	Slate	Sandstone
8. Overburden:										
(a) Maximum	700'	150'	350'	-	870'	-	-	-	450'	80'
(b) Minimum	0	0	0	-	40'	-	-	-	325'	40'
(c) Ayerage	500'	100'	250'	-	500'	400'	-	-	387'	60'
9. System of mining	Pillar robbing	Longwall skip	Breasts-and-pillar	Gangways and breasts	Breast - pillar Splitting-skipping	Room-and-pillar	Gangway-and-pillar	Gangway chute slants	Pillar extraction Pillar chute	Chute and breasts
10. What percentage of coal is mined on development or advance work?	50	10	60	-	44	40	-	-	Pillar mining only	50
11. Size of pillars in:										
(a) Entries	36'	30'	25'	30'	40' x 40'	55'	30' - 40'	60'	Irregular	20' x 50'
(b) Rooms	24' and 30'	30'	20'	-	30' x 50'	30'	-	50'	-	20' x 30'
(c) Retreat mining	8' to 10'	-	8'	-	Variable	30'	-	50'	-	20' x 25'
12. On what centers are:										
(a) Entries	300' to 450'	250'	150'	40'	50'	55'	-	60'	-	200' - 250'
(b) Rooms	60'	60'	35'	-	50'	-	-	50'	-	55' - 50'
(c) Breakthroughs	60'	60'	60'	-	40' x 60'	60'	-	50'	-	- 60'
(d) Pillar mining	60'	30'	Skips	-	50'		20' Centers	-	-	50' - 55'
13. Pillar mining:										
(a) Complete extraction	-	-	-	Complete extraction	-	-	Complete extraction	Complete extraction	Complete extraction	Complete extraction
(b) Partial extraction	Partial extraction	Partial extraction	Partial extraction	-	Partial extraction	Partial extraction	-	-	-	-
14. Width of places:										
(a) Entries	12'	12'	12'	10'	6' - 15'	10'	10'	8' x 7'	-	12'
(b) Rooms	25' to 30'	-	20'	-	6' - 30'	-	-	5' x 5'	-	12' - 30'
(c) Breakthroughs	6'	6'	6'	-	4' - 15'	60'	-	-	-	8' - 10'
(d) Open-end cutovers	6'	12'	6'	-	-	-	-	25'	-	-
(e) Pocket and wing:										
1. Pocket	-	6'	-	-	-	-	-	5' x 5'	-	-
2. Wing	-	6'	-	-	-	-	-	-	-	-
15. Roof bolting - concurrent or subsequent to face mining?	None	None	None	None	None	None	None	None	-	-
(a) Timbering concurrent or subsequent to face mining?	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent
16. Roof-support development:										
(a) Bolts	-	-	-	-	-	-	-	-	-	-
(b) X-bars	X-bars	-	-	-	X-bars	X-bars	-	X-bars	X-bars	X-bars
(c) Posts	Posts	Posts	Posts	Posts	Posts	Posts	-	Posts	Posts	Posts
(d) Bolts and x-bars	-	-	-	-	-	-	-	-	-	-
(e) Bolts and posts	-	-	-	-	-	-	-	-	-	-
(f) Self-supporting	-	-	-	-	-	-	-	-	-	-
17. Roof support - retreat mining:										
(a) Bolts	-	-	-	-	-	-	-	-	-	-
(b) X-bars	X-bars	-	-	-	X-bars	X-bars	-	X-bars	X-bars	X-bars
(c) Posts	Posts	Posts	Posts	Posts	Posts	Posts	-	Posts	Posts	Posts
(d) Bolts and x-bars	-	-	-	-	-	-	-	-	-	-
(e) Bolts and posts	-	-	-	-	-	-	-	-	-	-
(f) Self-supporting	-	-	-	-	-	-	-	-	-	-
18. Roof-bolt anchorage:										
(a) Massive rock	-	-	-	-	-	-	-	-	-	-
(b) Laminated shale	-	-	-	-	-	-	-	-	-	-
(c) Coal	-	-	-	-	-	-	-	-	-	-
(d) Other	-	-	-	-	-	-	-	-	-	-
19. Do you have a standard roof-support plan?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20. If available, attach a roof-support plan	No	No	No	No	No	No	No	No	No	No
21. What percentage of accidents occurred from falls of roof, sides, or face?										
1955	None	100	100	None	3.9	None	100	60	None	None
1956	100	100	25	100	2.4	100	100	60	100	32
22. What percentage of roof-fall accidents occurred within 25 ft. of working face?										
1955	0	100	100	-	100	-	-	100	-	-
1956	0	100	25	50	75	100	100	100	100	100
23. What percentage of roof-fall accidents occurred where roof-support plan was not followed?										
1955	0	100	100	-	-	-	-	50	-	-
1956	0	100	25	-	-	-	-	20	100	-
24. Where roof supports are used, what percentage of roof-fall accidents occurred inby last roof support?										
1955	0	0	100	-	16.6	-	-	60	-	-
1956	0	0	25	-	-	-	-	20	100	-
25. What percentage of roof-fall accidents occurred in -										
(a) Advance or development mining -										
1955	0	0	100	-	33.3	100	-	50	-	-
1956	0	0	5	50	-	-	-	40	-	-
(b) Pillar or retreat mining -										
1955	0	100	-	-	66.7	-	100	50	-	-
1956	100	100	20	-	100	-	100	40	100	100
26. What percentage of roof-fall accidents occurred in following areas?	1955 / 1956	1955 / 1956	1955 / 1956	1955 / 1956	1955 / 1956	1955 / 1956	1955 / 1956	1955 / 1956	1955 / 1956	1955 / 1956
(a) Roof-bolted area	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -
(b) Timbered area	- / 100	100 / 100	100 / 100	- / 100	100 / 100	- / 100	100 / 100	100 / 100	- / 100	- / 100
(c) Combination timber and roof bolts	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -
(d) Self-supporting roof	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -	- / -
27. Do you consider roof-control plan or method adequate; if not, what do you recommend?	Plan appears adequate. Special attention warranted in maintenance of pillar chutes.	Plan appears adequate.	Special attention warranted at working face.	Plan appears adequate.	Plan appears adequate.	Special attention warranted at working face.	Plan appears adequate.	Special attention warranted at working face.	Special attention warranted at face area.	Plan appears adequate.

1. State	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania
2. Mine	"G1"	"G2"	"G3"	"G4"	"G5"	"G6"	"G7"	"G8"	"G9"	"G10"
3. Coal seam	Anthracite Diamond-Dunmore	Anthracite Mammoth	Anthracite Big Buck-7 Ft.	Anthracite Skidmore	Anthracite Rock-14 Ft.-Clark	Anthracite 14 Ft. Clark Dun. 3-4	Anthracite Skidmore-Mammoth	Anthracite Mammoth-Holmes Primrose	Anthracite Mammoth Holmes-Primrose	Anthracite Buck-Skidmore Mammoth-Holmes
4. Thickness of coal seam	3' to 16'	25'	4.5 ft. avg.	8'	4.1' to 11'	3' to 14'	4' to 9'	8' to 11'	4'9" to 7'	3.5' to 20'
5. Immediate top	Black shale Soft sandstone	Coal	Coal	Slate	Slate	Slate Sandstone	Slate Sandstone	Slate Sandstone	Slate Sandstone	Sandstone
6. Secondary top	Sandstone	Slate and sandstone	Coal	Sandstone	Sandstone	do.	Slate - Shale Sandstone	Shale Sandstone	Shale Sandstone	Sandstone
7. Type of bottom	Soft shales	Slate - Sandstone	Slate	Slate	Slate	Slate - Sandstone	Slate - Shale	Slate - Shale	Slate - Shale	Slate - Sandstone
8. Overburden:										
(a) Maximum	600'	700'	-	500'	650'	850'	800'	700'	500'	-
(b) Minimum	250'	300'	-	250'	10'	20'	0	0	0	-
(c) Average	160'	500'	-	350'	350'	450'	400'	350'	250'	-
9. System of mining	Pillar mining	Drive chutes Rob Back	Breastwork	Rooms	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar
10. What percentage of coal is mined on development or advance work?	15	4	10	15	55	55	35	35	35	52
11. Size of pillars in:										
(a) Entries	50' or 60' x 25'	-	25' x 25'	26' x 26'	60' x 30'	60' x 30'	-	-	-	30'
(b) Rooms	Same	35' x 35'	30' x 30'	24' x 24'	60' x 30'	60' x 30'	26' and 16' x 60'	16' to 20' x 60'	16' to 26' x 60'	30'
(c) Retreat mining	Varying size	-	-	10'	Variable	Variable	-	-	-	Varies
12. On what centers are:										
(a) Entries	50' - 60'	-	75'	50'	42'	42'	-	-	-	35'
(b) Rooms	50' - 60'	45'	50'	-	54'	54'	40' to 70'	35' to 70'	40' to 70'	50' to 60'
(c) Breakthroughs	50' - 60'	60'	55'	-	72'	72'	60'	60'	60'	60'
(d) Pillar mining	50' - 60'	-	-	-	-	-	-	-	-	Varies
13. Pillar mining:										
(a) Complete extraction	Complete extraction	Complete extraction	-		Some areas complete extraction	Residential areas partial	None	Complete extraction	-	Complete extraction
(b) Partial extraction	-	-	-	Partial extraction	Partial extraction	Partial	Partial	Partial	Partial extraction	-
14. Width of places:										
(a) Entries	12' to 24'	-	6'	12'	12'	12'	12'	12'	12'	12'
(b) Rooms	24' to 34'	10'	18'	24'	24'	24'	24'	24'	24'	24' - 30'
(c) Breakthroughs	12' to 15'	6'	6'	8'	12'	12'	6'	6'	6'	8'
(d) Open-end cutovers	-	-	-	-	-	-	-	-	-	-
(e) Pocket and wings:										
1. Pocket	-	-	-	-	-	-	-	-	-	-
2. Wing	-	-	-	-	-	-	-	-	-	-
15. Roof bolting - concurrent or subsequent to face mining?	-	None	None	-	-	None	None	None	None	None
(a) Timbering concurrent or subsequent to face mining?	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent
16. Roof-support development:										
(a) Bolts	-	-	-	-	-	-	-	-	-	-
(b) X-bars	X-bars	3 piece	-	X-bars	X-bars	X-bars	X-bars	X-bars	X-bars	X-bars
(c) Posts	Posts	Timber sets	Posts	-	Posts	Posts	Posts	Posts	Posts	Posts
(d) Bolts and x-bars	-	Lagged	-	-	-	-	-	-	-	-
(e) Bolts and posts	-	-	-	-	-	-	-	-	-	-
(f) Self-supporting	-	-	-	-	Some self-supporting	Some self-supporting	-	-	-	-
17. Roof support - retreat mining:										
(a) Bolts	-	-	-	-	-	-	-	-	-	-
(b) X-bars	X-bars	-	-	-	X-bars	X-bars	X-bars	X-bars	X-bars	X-bars
(c) Posts	Posts	-	-	Posts	Posts	Posts	Posts	Posts	Posts	Posts
(d) Bolts and x-bars	-	-	-		-	-	-	-	-	-
(e) Bolts and posts	-	-	-		-	-	-	-	-	-
(f) Self-supporting	-	-	-		-	-	-	-	-	-
18. Roof-bolt anchorage:										
(a) Massive rock	-	-	Massive	-	-	-	-	-	-	-
(b) Laminated shale	-	-	Rock	-	-	-	-	-	-	-
(c) Coal	-	-	Top	-	-	-	-	-	-	-
(d) Other	-	-	-	-	-	-	-	-	-	-
19. Do you have a standard roof-support plan?	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes
20. If available, attach a roof-support plan	No	No	No	No	No	No	No	No	No	No
21. What percentage of accidents occurred from falls of roof, sides, or face?										
1955	4.93	None	None	None	22.7	None	21	11	26	8
1956	12.02	2.7	33	70	12.1	5.7	19	25	3	11
22. What percentage of roof-fall accidents occurred within 25 ft. of working face?										
1955	66.6	0	0	0	90	0	95	100	100	7
1956	85.7	0	17	90	100	100	96	100	100	5
23. What percentage of roof-fall accidents occurred where roof-support plan was not followed?										
1955	66.6	0	0	0	10	0	0	0	0	0
1956	42.8	0	0	0	-	0	0	0	0	0
24. Where roof supports are used, what percentage of roof-fall accidents occurred inby last roof support?										
1955	33.3	0	0	0	50	0	76	80	75	0
1956	42.8	0	33	90	40	100	67	56	50	0
25. What percentage of roof-fall accidents occurred in -										
(a) Advance or development mining -										
1955	66.6	0	-	100	10	0	95	60	63	0
1956	14.3	0	17	0	-	0	92	100	100	1
(b) Pillar or retreat mining -										
1955	33.4	0	-	0	90	0	5	40	37	5
1956	85.7	100	-	0	100	100	8	0	0	3
26. What percentage of roof-fall accidents occurred in the following areas?	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956
(a) Roof-bolted area	- -	0 0	0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
(b) Timbered area	100 14.29	0 100	0 33.3	0 100	90 100	0 100	100 100	100 100	100 100	100 100
(c) Combination timber and roof bolts	- -	0 0	0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
(d) Self-supporting roof	- 85.71	0 0	0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
27. Do you consider roof-control plan or method adequate; if not, what do you recommend?	No. Additional timbering warranted.	Yes	More attention appears warranted at face.	Special attention appears warranted at working face.	Yes	Additional roof support warranted.	Special attention warranted at working face.	Special attention warranted at working face.	Special attention warranted at working face.	Roof support appears adequate.

1. State	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania
2. Mine	"H1"	"H2"	"H3"	"H4"	"H5"	"H6"	"H7"	"H8"	"H9"	"H10"
3. Coal seam	Anthracite Mammoth	Anthracite #4 Lykens	Anthracite Lykens	Anthracite Buck Mtn.-Lykens	Anthracite 2-3 Do. Veins	Anthracite Skidmore U. and L. 5' Vein U. and L. Baltimore	Anthracite Pittston-Marcy Hillman	Anthracite Pittston-Clark-Marcy	Anthracite Clark-Pittston-Marcy	
4. Thickness of coal seam	10' to 80'	4'	8'	3' to 10'	4.5"	4' to 8'	12'-5'-8'	10'-3'-4'	3'-10'-4'	
5. Immediate top	Sandstone or slate	Slate	Rock	Conglomerate	Slate Sandstone	Rock	Rock Sandstone	Sandstone	Slate	
6. Secondary top	Sandstone	Rock	do.	Sand-sulfur	Sandstone	Shale	Sandstone	do.	Sandstone	
7. Type of bottom	Slate or sandstone	do.	Slate	Rock	Slate and sandstone	Rock	do.	Slate	Slate	
8. Overburden:										
(a) Maximum	-	-	210'	40'	400'	664'	435'	-	-	
(b) Minimum	-	-	0	27'	220'	66'	41'	-	-	
(c) Average	-	-	100'	34'	310'	375'	250'	200'	300'	
9. System of mining	Breast-and-pillar-chute	Breast-and-pillar	-	Chamber Pillar	Chamber Pillar	Chamber Pillar	Room-and-pillar	Chamber - Pillar	Chamber - Pillar	
10. What percentage of coal is mined on development or advance work?	100	10	33-1/3	30	15	15	15	30	20	
11. Size of pillars in:										
(a) Entries	60'	30'	10'	30' - 40'	30'	35' x 60'	60' x 30'	-	30' x 60'	
(b) Rooms	40' - 60'	26'	20'	-	30'	60' x 26'	60' x 30'	30' x 60'	30' x 60'	
(c) Retreat mining	-	-	-	-	30'	-	60' x 30'	-	10' x 10'	
12. On what centers are:										
(a) Entries	60'	-	300'	50' and 55'	42'	50'	-	-	60'	
(b) Rooms	40' - 60'	-	50'	-	60'	50'	50'	50'	-	
(c) Breakthroughs	60'	-	60'	60'	50'	60'	60'		60'	
(d) Pillar mining	-			-	60'	50'	-		30'	
13. Pillar mining:										
(a) Complete extraction	Complete extraction	Complete extraction	-	None	-	60% complete	10% complete	Complete	Complete	
(b) Partial extraction	-	-	Partial extraction	None	Partial extraction	40% partial	90% partial	-	-	
14. Width of places:										
(a) Entries	Breasts 18'-24'	8'	10'	16' - 20'	12'	12'	12'	14'	14'	
(b) Rooms	60'	24'	20'	-	25'	24'	20'	24'	24'	
(c) Breakthroughs	-	6'	5'	10'	10'	12' to 14'	10'	10'	10'	
(d) Open-end cutovers	-	-	-	-	-	-	-	-	-	
(e) Pocket and wing						-	-	-	-	
1. Pocket	-	-	-	-	-	-	-	-	-	
2. Wing	-	-	-	-	-	-	-	-	-	
15. Roof bolting - concurrent or subsequent to face mining?	-	-	-	-	-	-	-	-	-	
(a) Timbering concurrent or subsequent to face mining?	Concurrent	Concurrent	Concurrent	Concurrent	Subsequent	Subsequent	Concurrent	Concurrent	Concurrent	
16. Roof-support development:										
(a) Bolts	Bolts Gangways Airways	-	-	-	-	-	-	-	-	
(b) X-bars	-	-	-	-	X-bars	X-bars	X-bars	X-bars	X-bars	
(c) Posts	-	Posts	Posts	Posts	Posts	Posts	Posts	Posts	Posts	
(d) Bolts and x-bars	Bolts - X-bars	-	-	-	-	-	-	-	-	
(e) Bolts and posts	-	-	-	-	-	-	-	-	-	
(f) Self-supporting	-	-	-	-	-	-	-	-	-	
17. Roof support - retreat mining:										
(a) Bolts	-	-	-	-	-	-	-	-	-	
(b) X-bars	X-bars	-	-	-	-	X-bars	X-bars	X-bars	X-bars	
(c) Posts	-	Posts	Posts	-	Posts	Posts	Posts	Posts	Posts	
(d) Bolts and x-bars	-	-	-	-	-	-	-	-	-	
(e) Bolts and posts	-	-	-	-	-	-	-	-	-	
(f) Self-supporting	-	-	-	-	-	-	-	-	-	
18. Roof-bolt anchorage:										
(a) Massive rock	Massive rock	-	-	-	-	-	-	-	-	
(b) Laminated shale	-	-	-	-	-	-	-	-	-	
(c) Coal	-	-	-	-	-	-	-	-	-	
(d) Other	-	-	-	-	-	-	-	-	-	
19. Do you have a standard roof-support plan?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
20. If available, attach a roof-support plan	Yes	No	No	No	No	No	No	No	No	
21. What percentage of accidents occurred from falls of roof, sides, or face?										
1955	5.9	100	30	-	100	4	3.3	-	None	
1956	5.37	None	None	100	100	1	1.2	-	5	
22. What percentage of roof-fall accidents occurred within 25 ft. of working face?										
1955	80	100	100	-	100	100	100	5	0	
1956	80	-	-	100	100	100	100	5	100	
23. What percentage of roof-fall accidents occurred where roof-support plan was not followed?										
1955	-	-	-	-	-	0	0	0	0	
1956	-	-	-	100	-	0	0	0	0	
24. Where roof supports are used, what percentage of roof-fall accidents occurred inby last roof support?										
1955	80	100	100	-	-	100	100	1	0	
1956	60	-	-	100	-	100	100	1	0	
25. What percentage of roof-fall accidents occurred in -										
(a) Advance or development mining -										
1955	20	-	-	-	-	0	0	0	0	
1956	40	-	-	100	-	100	0	0	0	
(b) Pillar or retreat mining -										
1955	80	100	100	-	100	0	100	100	0	
1956	60	-	-	-	100	100	100	100	100	
26. What percentage of roof-fall accidents occurred in following areas?	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	
(a) Roof-bolted area	- -	- -	- -	- -	- -	- -	- -	- -	- -	
(b) Timbered area	100 100	100 -	100 -	- 100	100 100	100 100	100 100	100 100	- 100	
(c) Combination timber and roof bolts	- -	- -	- -	- -	- -	- -	- -	- -	- -	
(d) Self-supporting roof	- -	- -	- -	- -	- -	- -	- -	- -	- -	
27. Do you consider roof-control plan or method adequate; if not, what do you recommend?	Plan appears to be adequate.	Plan appears to be adequate.	Close supervision of working face warranted.	Plan appears to be adequate.	Plan appears to be adequate.	Need additional roof support in face area.	Additional support warranted at working face.	Need of revision in method of roof support.	Face area is danger point.	

1. State	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania
2. Mine	"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"	"I"	"J"
3. Coal seam	Pittsburgh	Pittsburgh	Pittsburgh	Pittsburgh	Pittsburgh	Pittsburgh	Pittsburgh	Pittsburgh	Pittsburgh	Pittsburgh
4. Thickness of coal seam	94"	96"	94"	86"	103"	94"	84"	97"	94"	66" to 78"
5. Immediate top	Draw slate Wild coal	Draw slate	Roof coal Draw slate Wild coal	Draw slate	Draw slate Wild coal Shale	Draw slate Wild coal	Draw slate Wild coal	Draw slate Wild coal	Draw slate Wild coal	Roof coal Draw slate Shale
6. Secondary top	Massive Sandstone	Sandstone	Checker slate Shale	Massive Sandstone	do.	Massive Sandstone	Sandstone	Massive Sandstone	Massive Sandstone	Sandstone Laminated shale
7. Type of bottom	Hardpan Fireclay	Hardpan Fireclay	Fireclay	Fireclay	Fireclay	Hardpan Fireclay	Fireclay	Fireclay	Fireclay	Fireclay
8. Overburden:										
(a) Maximum	650'	350'	390'	350'	600'	500'	400'	545'	500'	650'
(b) Minimum	450'	100'	165'	150'	200'	250'	100'	220'	350'	450'
(c) Average	500'	250'	270'	200'	450'	350'	300'	400'	400'	550'
9. System of mining	Block	Block	Block	Block	Block	Block	Block	Block	Block	Block
10. What percentage of coal is mined on development or advance work?	30	40	40	40	40	30	40	40	30	28
11. Size of pillars in:										
(a) Entries	63' x 92'	48' x 103'	48' x 100'	70' x 70'	63' x 103'	63' x 92'	56' x 100'	63' x 88'	63' x 92'	98' x 98'
(b) Rooms	63' x 102'	48' x 103'	63' x 88'	70' x 70'	56' x 78'	63' x 102'	86' x 115'	63' x 88'	63' x 102'	96' x 96'
(c) Retreat mining	63' x 102'	48' x 103'	63' x 88'	70' x 70'	56' x 78'	63' x 102'	56' x 86'	63' x 88'	63' x 102'	96' x 96'
12. On what centers are:										
(a) Entries	75'	60'	60'	85'	70'	75'	70'	75'	75'	112'
(b) Rooms	115'	115'	100'	85'	92'	115'	100'	100'	115'	112'
(c) Breakthroughs	75'	60'	100'	85'	92'	75'	100'	100'	75'	112'
(d) Pillar mining	75' x 115'	48' x 103'	75' x 100'	85'	70' x 92'	75' x 115'	70' x 100'	75' x 100'	75' x 115'	112'
13. Pillar mining:										
(a) Complete extraction	Complete extraction	Complete extraction	Complete extraction	Complete extraction	Complete extraction	Complete extraction	Complete extraction	Complete extraction	Complete extraction	Complete extraction
(b) Partial extraction	-	-	-	-	-	-	-	-	-	-
14. Width of places:										
(a) Entries	12' to 12.5'	12'	12'	16'	14'	12' and 14'	14'	14'	12' to 14'	14'
(b) Rooms	12.5' to 14'	14'	14'	16'	14'	14'	14'	14'	14'	16'
(c) Breakthroughs	12.5' to 14'	14'	14'	16'	14'	14'	14'	14'	12' to 14'	14'
(d) Open-end cutovers	20'	20'	20'	20'	-	20'	-	20'	20'	20'
(e) Pocket and wing:										
1. Pocket	12.5'	-	-	16'	14'	14'	14'	15'	14' to 15'	18'
2. Wing	12'	-	-	8'	10'	12'	12'	8'	12' to 8'	8'
15. Roof bolting - concurrent or subsequent to face mining?	Concurrent	Concurrent	None	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Bolted on cycle
(a) Timbering concurrent or subsequent to face mining?	do.	do.	Concurrent	do.	do.	do.	do.	do.	do.	Timbered on cycle
16. Roof-support development:										
(a) Bolts	Bolts	Bolts	-	Bolts	Bolts	Bolts	Bolts	Bolts	Bolts	Bolts
(b) X-bars	-	-	X-bars	-	X-bars	-	-	-	-	X-bars where necessary
(c) Posts	-	-	Posts	-	Posts	-	-	-	-	Posts - Same
(d) Bolts and x-bars	Bolts and planks	-	-	-	Bolts and x-bars	Bolts and planks	-	-	Bolts and planks	-
(e) Bolts and posts	-	-	-	-	-	-	-	-	-	-
(f) Self-supporting	-	-	-	-	-	-	-	-	-	-
17. Roof support - retreat mining:										
(a) Bolts	Bolts	Bolts	-	Bolts	Bolts	Bolts	Bolts	Bolts	Bolts	-
(b) X-bars	X-bars - Cribs	-	X-bars - Posts and cribs	-	X-bars	X-bars	-	-	X-bars	X-bars
(c) Posts	Posts	Posts - Cribs		Posts	Posts	Posts	Posts and cribs	Posts	Posts	Posts and cribs
(d) Bolts and x-bars	Bolts and planks	-	-	-	Bolts, posts and cribs	Bolts, planks and cribs	-	-	Bolts and planks	-
(e) Bolts and posts	-	-	-	-	-	-	-	-	Cribs	-
(f) Self-supporting	-	-	-	-	-	-	-	-	-	-
18. Roof-bolt anchorage:										
(a) Massive rock	Massive rock	Massive rock	No bolting	Massive rock	-	Massive rock	Massive rock	Massive sandstone	Massive rock	-
(b) Laminated shale	Laminated shale	-	-	-	Laminated shale	Laminated shale	-	-	Laminated shale	Laminated shale
(c) Coal	Wild coal	-	-	-	-	Wild coal	-	-	Wild coal	-
(d) Other	-	-	-	-	-	-	-	-	-	-
19. Do you have a standard roof-support plan?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20. If available, attach a roof-support plan	No	No	No	No	No	No	No	No	No	No
21. What percentage of accidents occurred from falls of roof, sides, or face?										
1955	20	None	66.7	100	14.3	12.5	None	50	30.8	10
1956	19	None	None	50	12.5	None	None	20	66.7	9
22. What percentage or roof-fall accidents occurred within 25 ft. of working face?										
1955	66.7	None	50	100	None	100	None	100	75	62
1956	50	None	None	None	100	None	None	100	100	38
23. What percentage of roof-fall accidents occurred where roof-support plan was not followed?										
1955	66.7	None	None	None	100	100	None	None	12.5	None
1956	None	None	None	None	None	None	None	None	25	None
24. Where roof supports are used, what percentage of roof-fall accidents occurred inby last roof support?										
1955	100	None	None	None	None	100	None	100	25	12
1956	None	None	None	None	100	None	None	None	25	None
25. What percentage of roof-fall accidents occurred in -										
(a) Advance or development mining -										
1955	67.7	None	None	100	None	100	None	None	37.5	50
1956	None	None	0	None	None	None	None	None	25	53
(b) Pillar or retreat mining -										
1955	33.3	None	100	None	100	None	None	100	62.5	43
1956	None	None	0	None	100	None	None	100	75	30
26. What percentage of roof-fall accidents occurred in following areas?	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956
(a) Roof-bolted area	33 25	- -	- -	100 None	- -	- -	- -	100 100	62.5 12.5	12 15
(b) Timbered area	33 0	- -	50 -	- -	100 100	- -	- -	- -	37.5 -	88 85
(c) Combination timber and roof bolts	34 75	- -	Abandoned area -	- -	- -	100 -	- -	- -	- 87.5	- -
(d) Self-supporting roof	0 0	- -	50 -	- -	- -	- -	- -	- -	- -	- -
27. Do you consider roof-control plan or method adequate; if not what do you recommend?										

1. State	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania	Pennsylvania
2. Mine	"B1"	"B2"	"B3"	"B4"	"B5"	"B6"	"B7"	"B8"	"B9"	"B10"
3. Coal seam	Pittsburgh	Pittsburgh	Pittsburgh	Pittsburgh	Pittsburgh	Pittsburgh	Pittsburgh	Lower Freeport	Upper Freeport	Pocahontas #4
4. Thickness of coal seam	66"	64"	64"	60"	75"	84"	64"	36"	42"	36"
5. Immediate top	Laminated coal and shale	Draw slate mined with coal	Draw slate mined with coal	Draw slate mined with coal	Draw slate mined with coal	Draw slate mined with coal	Draw slate	Shale	Slate	Hard shale
6. Secondary top	Shale rock	Laminated coal and shale	Laminated coal and slate	Laminated coal and rock	Shale - Coal or sandrock	Coal - Slate lime Shale	Rooster coal	Sandy shale	Sandrock	Sandstone
7. Type of bottom	Limestone	Fireclay	Fireclay	Fireclay	Fireclay	Fireclay	Fireclay	Fireclay	Fireclay	Sandstone fireclay
8. Overburden:										
(a) Maximum	480'	500'	500'	500'	900'	550'	150'	300'	300'	800'
(b) Minimum	50'	25'	25'	25'	260'	150'	30'	40'	50'	0
(c) Average	250'	250'	250'	250'	400'	400'	100'	200'	150'	400'
9. System of mining	Modified block	Modified block	Modified block	Modified block	Block system	Modified block	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar
10. What percentage of coal is mined on development or advance work?	39	42	42	42	30	35	Pillar work only	Pillar work only	40	40
11. Size of pillars in:										
(a) Entries	47' x 96'	94' x 40'	94' x 40'	94' x 40'	55' x 100'	100' x 60'	40'	44' x 83'	34' x 34'	60' x 80'
(b) Rooms	None	None	None	None	55' x 100'	100' x 60'	30'	27' x 83'	9' x 18'	60' x 80'
(c) Retreat mining	47' x 96'	94' x 40'	94' x 40'	94' x 40'	55' x 100'	100' x 60'	30'	27' x 82'	-	60' x 80'
12. On what centers are:										
(a) Entries	61'	54'	54'	54'	70'	74.35'	Pillars of various size	60'	50'	80'
(b) Rooms	None	None	-	-	115'	74.35'	-	50'	25' and 50'	80'
(c) Breakthroughs	110'	94'	94'	94'	115'	115.47'	-	100'	-	100'
(d) Pillar mining	-	-	-	-	70' x 115'	115.47'	-	50'	-	100'
13. Pillar mining:										
(a) Complete extraction ... percent	Complete extraction	Complete extraction	Complete extraction	Complete extraction	Complete extraction	Complete extraction	Complete extraction	Complete extraction	None	90 complete extraction
(b) Partial extraction ... do.	-	-	-	-	-	-	-	-	-	10 partial
14. Width of places:										
(a) Entries	14'	14"	14'	14'	15'	14'	12'	16'	16' and 18'	12'
(b) Rooms	-	-	-	-	15'	14'	16'	23'	16' and 25'	20'
(c) Breakthroughs	14'	14'	14'	14'	15'	14'	12'	17'	16'	18'
(d) Open-end cutovers	23' maximum	20'	20'	20'	-	18'		-		22'
(e) Pocket and wing:										
1. Pocket	-	-	-	-	15'	20'	-	12'	-	22'
2. Wing	-	-	-	-	9'	20'	-	6' to 8'	-	25'
15. Roof bolting - concurrent or subsequent to face mining?	Subsequent to face mining	Subsequent	Subsequent	Subsequent	Subsequent	-	-	-	Concurrent	Concurrent
(a) Timbering concurrent or subsequent to face mining?	-	do.	do.	do.	Subsequent and concurrent	Concurrent	Concurrent	Concurrent	do.	do.
16. Roof-support development:										
(a) Bolts	Bolts	Bolts	Bolts	Bolts	Bolts	-	-	-	Bolts	Bolts
(b) X-bars	-	-	-	-	X-bars	X-bars	X-bars	X-bars	X-bars	-
(c) Posts	-	-	-	-	-	Posts	Posts	Posts	Posts	Posts
(d) Bolts and x-bars	-	-	-	-	Bolts - X-bars	-	-	-	Bolts - X-bars	-
(e) Bolts and posts	-	-	-	-	-	-	-	-	Bolts and posts	-
(f) Self-supporting	-	-	-	-	-	-	-	-	Self-supporting	-
17. Roof support - retreat mining:										
(a) Bolts	-	-	-	-	Bolts	-	-	-	None	-
(b) X-bars	-	-	-	-	X-bars	X-bars	X-bars	X-bars	-	-
(c) Posts	-	-	-	-	Posts	Posts	Posts	Posts	-	Posts
(d) Bolts and x-bars	-	-	-	-	Bolts - X-bars	-	-	-	-	-
(e) Bolts and posts	Bolts - Posts	Bolts - X-bars	Bolts - Posts	Bolts - Posts	Bolts - Posts	-	-	-	-	Bolts - Posts
(f) Self-supporting		-	-	-	-	-	-	-	-	-
18. Roof-bolt anchorage:										
(a) Massive rock	-				Massive rock	No bolting	No bolting	No bolting	Massive rock	Massive rock
(b) Laminated shale	Laminated shale				Laminated shale	-	-	-	Shale	-
(c) Coal	-				Coal	-	-	-	-	-
(d) Other	-	Laminated coal - Shale	Laminated coal - Shale	Coal - Laminated Shale - Sandrock	- -	- -	- -	- -	- -	- -
19. Do you have a standard roof-support plan?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20. If available, attach a roof-support plan	Yes	Yes	Yes	Yes	Yes	No	No	No	Yes	Yes
21. What percentage of accidents occurred from falls of roof, sides, or face?										
1955	35	28	10	20	24	30	None	Mine idle	16.6	15
1956	24	20	25	16-2/3	18	15	None	None	27.3	19
22. What percentage of roof-fall accidents occurred within 25 ft. of working face?										
1955	75	100	100	0	75	67	0	0	100	100
1956	62.5	50	100	100	0	67	0	0	66.6	90
23. What percentage of roof fall accidents occurred where roof-support plan was not followed?										
1955	8.3	0	0	0	25	0	0	0	33.3	75
1956	12.5	0	0	0	0	0	0	0	33.3	75
24. Where roof supports are used, what percentage of roof-fall accidents occurred inby last roof support?										
1955	25	50	0	0	25	17	0	0	33	80
1956	25	50	50	100	0	0	0	0	50	90
25. What percentage of roof-fall accidents occurred in -										
(a) Advance or development mining -										
1955	50	100	0	100	75	17	0	0	100	25
1956	25	0	50	100	0	0	0	0	100	33
(b) Pillar or retreat mining -										
1955	50	100	100	0	25	8	0	0	0	75
1956	75	0	50	0	100	100	0	0	0	67
26. What percentage of roof-fall accidents occurred in following areas?										
(a) Roof-bolted area, 1955	50	100	0	100	25		0		0	25
(a) Roof-bolted area, 1956	75	100	50	100	0		0		0	
(b) Timbered area, 1955	0	0	0	0	75	100	0	0	100	-
(b) Timbered area, 1956	0	0	0	0	0	100	0	0	100	67
(c) Combination timber and roof bolts, 1955	50	0	0	0	0		0	0	0	75
(c) Combination timber and roof bolts, 1956	25	0	0	0	100		0	0	0	33
(d) Self-supporting roof, 1955		0	100	0	0		0	0	0	-
(d) Self-supporting roof, 1956	0	0	50	0	0		0	0	0	-

1. State	Ohio	Ohio	Ohio	Utah	Utah	Indiana	Indiana	Indiana	Utah
2. Mine	"C1"	"C2"	"C3"	"C4"	"C5"	"C6"	"C7"	"C8"	"C9"
3. Coal seam	Pittsburgh #8	Pittsburgh #8	Pittsburgh #8	Lower Sunnyside	Lower Sunnyside	Indiana #3	5th Vein	Indiana #5	Hiawatha "A" and "B"
4. Thickness of coal seam	60"	54"	60"	168"	144" to 168"	72"	60" to 90"	48"	11' to 13' - 9' to 10' - 7' to 10'
5. Immediate top	Roof coal	Roof coal	Draw slate	Sandy shale	Sandy shale, sandstone	Shale	Black slate shale	Black slate	Shale - Sandstone
6. Secondary top	Conglomerate of soapstone and shale	Conglomerate of soapstone and shale	Roof coal	Sandstone	Sandstone	do.	Limestone	Gray shale	Do.
7. Type of bottom	Hard shale	Soft shale	Fireclay	do.	do.	Clay	Fireclay	Fireclay	Slate Clay
8. Overburden:									
(a) Maximum	300'	210'	550'	2,500'	2,200'	550'	460'	275'	2,200'
(b) Minimum	55'	55'	90'	450'	300'	550'	370'	175'	1,600'
(c) Average	140'	110'	400'	1,200'	1,000'	550'	400'	225'	1,800'
9. System of mining	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar
10. What percentage of coal is mined on development or advance work?	30	30	30	30	33	All mining done on the advance work	20	30	40 to 50
11. Size of pillars:									
(a) Entries	22'	22'	28'x58'-38'x58'	60'x140'-80'x180'	80'x80'-80'x160'	36' x 36'	27' x 42'	26' x 26'	60' x 60'
(b) Rooms	8'	6'	10'x60'-16'x60'	60' x 80'	80' x 80'	24' x 24'	22' x 39'	16' x 16'	60' x 60'
(c) Retreat mining	None	None	None	60' x 80'	80' x 160'	None	-	None	60' x 60'
12. On what centers are:									
(a) Entries	32'	32'	40' - 50'	80' - 100'	80'	50'	40' - 60'	40'	80'
(b) Rooms	30'	24'	30' - 32'	60' - 80'	80' - 100'	50'	45' - 50'	40'	80'
(c) Breakthroughs	-	-	70'	100' - 200'	80' - 160'	65'	40' - 70'	70'	120'
(d) Pillar mining	None	None	-	60' - 80'	80' - 100'	-	70'	-	80' x 50'
13. Pillar mining:									
(a) Complete extraction	-	-	-	Complete extraction	Complete extraction		Complete extraction	-	Complete extraction
(b) Partial extraction	Partial	Partial	Partial	-	-	Stumping	-	Stumping	Partial mining near fault area
14. Width of places:									
(a) Entries	12'	11'	11'	14' - 16'	14' - 16'	14'	16'	14'	20'
(b) Rooms	22'	18'	16' - 20'	18' - 20'	16' - 20'	24'	24' to 30'	24'	20'
(c) Breakthroughs	8'	8'	11'	14' - 16'	14' - 16'	14'	-	14'	18'
(d) Open-end cutovers	-	-	-	-	-	-	-	-	-
(e) Pocket and wing:									
1. Pocket	-	-	-	25'	20'	-	-	-	-
2. Wing	-	-	-	20'	20'	-	-	-	-
15. Roof bolting - concurrent or subsequent to face mining?	-	-	-	Concurrent	Concurrent	Concurrent	Concurrent and subsequent	Subsequent	Concurrent
(a) Timbering concurrent or subsequent to face mining?	Concurrent	Concurrent	Concurrent	do.	do.	-	-	Concurrent	do.
16. Roof-support development:									
(a) Bolts	Bolts	-	Bolts	Bolts	Bolts	Bolts	Bolts	Bolts	Bolts
(b) X-bars	-	X-bars	-	-	X-bars	X-bars as needed	X-bars	-	Posts where needed
(c) Posts	-	Posts	-	-	Posts	Posts as needed	Posts	-	-
(d) Bolts and x-bars	-	-	-	-	Bolts - X-bars	Steel channel on main lines	Bolts - X-bars	-	-
(e) Bolts and posts	Bolts and posts	-	-	Bolts - Posts	-	Bolts - Posts as needed	Bolts - Posts	-	-
(f) Self-supporting	-	-	-	-	Self-supporting	-	Self-supporting	-	-
17. Roof support - retreat mining:									
(a) Bolts	None	None	Bolts	Bolts	Bolts	No retreat mining	-	No retreat mining	Bolts
(b) X-bars	-	-	-	X-bars	X-bars	-	-	-	X-bars
(c) Posts	-	-	-	Posts	Posts	-	Posts	-	Posts
(d) Bolts and x-bars	-	-	-	-	-	-	-	-	-
(e) Bolts and posts	-	-	-	Bolts - Posts	Bolts - Posts	-	-	-	-
(f) Self-supporting	-	-	-	-	-	-	-	-	-
18. Roof-bolt anchorage:									
(a) Massive rock	Lime rock	Not bolting	-	-					Massive rock
(b) Laminated shale	-	-	-	Laminated shale	Laminated shale	Shale	Laminated shale	Laminated shale	Shale
(c) Coal	-	-	-	-	-	-		-	-
(d) Other	-	-	Other	-	-	-	Other	-	-
19. Do you have a standard roof-support plan?	Yes	Yes	Yes	Yes	Yes	-	Yes	Yes	Yes
20. If available, attach a roof-support plan	Yes	Yes	No	No	No	Yes	No	No	No
21. What percentage of accidents occurred from falls of roof, sides, or face?									
1955	12	10	9	12.7	50	33	11	None	27.3
1956	13	15	11	16.05	16.6	18	11	None	40
22. What percentage of roof-fall accidents occurred within 25 ft. of working face?									
1955	100	50	50	100	83.33	10	46	0	75
1956	33	50	50	100	100	0	75	0	75
23. What percentage of roof-fall accidents occurred where roof-support plan was not followed?									
1955	0	0	0	0	0	0	0	0	0
1956	0	0	0	0	0	0	0	0	0
24. Where roof supports are used, what percentage of roof-fall accidents occurred inby last roof support?									
1955	100	50	No breakdown	100	33.3	10	23	0	0
1956	33.3	50	do.	100	100	0	25	0	0
25. What percentage of roof-fall accidents occurred in -									
(a) Advance or development mining -									
1955	100	50	do.	100	16.6	33	46	0	83.3
1956	66.6	50	do.	100	0	18	50	0	75
(b) Pillar or retreat mining -									
1955	None	-	do.	0		0	15	0	17.7
1956	-	-	do.	0		0	25	0	25
26. What percentage of roof-fall accidents occurred in following areas -	1955 / 1956	1955 / 1956	do.	1955 / 1956	1955 / 1956	1955 / 1956	1955 / 1956	1955 / 1956	1955 / 1956
(a) Roof-bolted area	- / 66	0 / 0		100 / 0	33.3 / 100	22 / 18	23 / 42	0 / 0	83.3 / 63
(b) Timbered area	100 / -	100 / 100		0 / 100	66.7 / 0	/ 0	15 / 8	0 / 0	0 / 0
(c) Combination timber and roof bolts	0 / ?	0 / 0		0 / 0	0 / 0	0 / 0	23 / 17	0 / 0	0 / 0
(d) Self-supporting roof	0 / 0	0 / 0		0 / 0	0 / 0	0 / 0	8 / 17	0 / 0	16.7 / 37

1. State	West Virginia	West Virginia	West Virginia	West Virginia	West Virginia	West Virginia	West Virginia	West Virginia	West Virginia	West Virginia
2. Mine	"O"	"P"	"Q"	"R"	"S"	"T"	"U"	"V"	"W"	"X"
3. Coal seam	Pocahontas #4	Pocahontas #4	Pocahontas #4	Pocahontas #3	Pocahontas #3	Pocahontas #4	Dorothy	Dorothy	No. 2 Gas	Pittsburgh
4. Thickness of coal seam	48" to 132"	66" to 96"	78" to 108"	58" to 66"	56" to 132"	48" to 132"	72"	72"	48"	62"
5. Immediate top	Sandy shale Sandstone	Laminated coal and shale	Laminated coal and shale	Laminated coal and shale	Shale or sandstone	Sandy shale and laminated coal	Laminated shale	Shale	Shale	Draw slate
6. Secondary top	do.	Shale	Shale and sandy shale	Shale	Sandy shale or sandstone	Shale	Sandstone	Sandstone	Sandstone	Roof coal
7. Type of bottom	Sandy shale	do.	Fireclay and shale	10" fireclay Shale	Shale	do.	Sandstone	Fireclay	Sandstone	Hard clay
8. Overburden:										
(a) Maximum	1,460'	600'	550'	1,100'	1,200'	1,140'	470'	800'	1,150'	800'
(b) Minimum	30'	30'	30'	30'	30'	30'	Outcrop	Outcrop	Outcrop	130'
(c) Average	1,030'	350'	300'	550'	600'	540'	-	425'	775'	375'
9. System of mining	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar
10. What percentage of coal is mined on development or advance work?	40	31	Retreat work only	65.35	48.95	-	55	10	All coal mined is on development	52
11. Size of pillars in:										
(a) Entries	52' x 72'	56' x 76'	56' x 76'	54' x 74'	54' x 74'	54' x 74'	50'	40' x 80'	64' x 80'	44' x 38'
(b) Rooms	27' x 72'	56' x 76'	56' x 76'	44' x 74'	54' x 74'	54' x 84'	70'	40' x 80'	25' x 80'	10'
(c) Retreat mining	52'x72'and 27'x72'	56' x 76'	56' x 76'	54'x74'and 44'x74'	54' x 74'	54'x74'and 54'x84'	-	-	-	-
12. On what centers are:										
(a) Entries	70'	70'	70'	70'	70'	70'	68'	60'	80'	30'-50'-55'-60'
(b) Rooms	45'	70'	70'	60'	70'	70'	88'	60'	50'	26'
(c) Breakthroughs	90'	90'	17'	90'	90'	90' and 100'	100'	100'	100'	90'
(d) Pillar mining	20'	16'	16' to 18'	16'	20'	51'	-	-	-	-
13. Pillar mining:										
(a) Completion extraction .... percent	Complete	Some sections	Complete	Complete	Complete	-			-	-
(b) Partial extraction .... do.	-	Some sections-60	-	-	-	50	Partial	Partial	-	-
14. Width of places:										
(a) Entries	18'	14'	14'	16'	16'	16'	18'	20'	16'	16' - 12'
(b) Rooms	18'	14'	14'	16'	16'	16'	18'	20'	25'	16'
(c) Breakthroughs	13' and 18'	14'	14'	16'	16'	16'	18'	-	-	12'
(d) Open-end cutovers	20'	16'	16' to 18'	16'	20'	None	-	- .	-	-
(e) Pocket and wing:										
1. Pocket	18'	16'	14'	16'	16'	18'	18'	20'	-	-
2. Wing	10'	12'	16'	10'	12'	33'	6'	8'	-	-
15. Roof bolting - concurrent or subsequent to face mining?	Subsequent work cycle	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent
(a) Timbering concurrent or subsequent to face mining?	Concurrent	do.	do.	do.	do.	do.	-	-	-	-
16. Roof-support development:										
(a) Bolts	Bolts	Bolts	-	Bolts	Bolts	Bolts	Bolts	Bolts	Bolts	Bolts
(b) X-bars	X-bars	-	X-bars	-	-	X-bars	Where needed	-	Where needed	-
(c) Posts	Posts	-	Posts	Safety Posts	-	Posts	Posts	-	do.	-
(d) Bolts and x-bars	Bolts - X-bars	Bolts and x-bars	Bolts - X-bars	Bolts - X-bars	-	Bolts and x-bars	-	Bolts and x-bars	-	-
(e) Bolts and posts	Bolts - Posts	Bolts and posts	Bolts - Posts	-	-	-	Bolts and posts	Bolts and posts	-	Bolts - Posts
(f) Self-supporting	In some areas	-	-	-	-	-	-	-	-	-
17. Roof support - retreat mining:										
(a) Bolts	Bolts	Bolts	-	-	Bolts	Bolts	Bolts	Bolts	-	-
(b) X-bars	X-bars	X-bars	X-bars	-	-	X-bars	Where needed	-	-	-
(c) Posts	Posts and cribs	Posts	Posts	Posts and bolts	-	Posts	Posts	-	-	-
(d) Bolts and x-bars	Bolts and x-bars	X-bars - Bolts	X-bars - Posts	X-bars and bolts	X-bars and bolts	X-bars and bolts	-	Bolts and x-bars	-	-
(e) Bolts and posts	Bolts and posts	Posts - Bolts	Bolts - Posts	-	Posts and bolts	-	Bolts and posts	Bolts and posts	-	-
(f) Self-supporting	-	-	-	-	-	-	-	-	-	-
18. Roof-bolt anchorage:										
(a) Massive rock	Sandstone	Massive rock	Massive rock	-	Sandstone	-	-	-	-	-
(b) Laminated shale	-	Shale	Shale	Shale	Laminated shale	-	Laminated shale	-	-	-
(c) Coal	-	-	-	-	-	-	-	-	-	-
(d) Other	-	-	-	-	-	Shale	-	Shale	Shale and sandstone	Conglomerate clay
19. Do you have a standard roof-support plan?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20. If available, attach a roof-support plan	Attached	Attached	Attached	Attached	Attached	Attached	-	-	-	Bolts on 4'centers
21. What percentage of accidents occurred from falls of roof, sides or face?										
1955	46.67	28.57	28.57	28.57	33.3	60	20	None	None	11
1956	26.09	35.29	33.33	None	None	25	10	40	None	8
22. What percentage of roof-fall accidents occurred within 25 ft. of working face?										
1955	100	100	100	75	100	66.67	50	None	0	50
1956	66.67	100	0	0	0	0	100	100	-	65
23. What percentage of roof-fall accidents occurred where roof-support plan was not followed?										
1955	None	None	100	33.33	0	33.33	None	None	0	0
1956	None	None	0	0	0	100	None	100	0	0
24. Where roof supports are used, what percentage of roof-fall accidents occurred inby last roof support?										
1955	20	0	100	33.33	0	0	None	None	0	0
1956	None	60	0	0	0	0	None	50	0	0
25. What percentage of roof-fall accidents occurred in -										
(a) Advance or development mining -										
1955	40	100	50	33.33	50	66.67	50	None	0	100
1956	None	75	0	0	-	100	100	100	0	100
(b) Pillar or retreat mining -										
1955	None	0	50	66.67	50	33.33	0	0	0	0
1956	100	25	0	0	0	0	0	0	0	0
26. What percentage of roof-fall accidents occurred in the following areas -	1955 / 1956	1955 / 1956	1955 / 1956	1955 / 1956	1955 / 1956	1955 / 1956	1955 / 1956	1955 / 1956	1955 / 1956	1955 / 1956
(a) Roof-bolted area	20 / 0	0 / 0	0 / 0	25 / 0	0 / 0	0 / 0	50 / 100	0 / 0	0 / 0	92 / 97
(b) Timbered area	80 / 33.3	100 / -	100 / 0	50 / 0	0 / 0	66.67 / 100	0 / 0	0 / 100	0 / 0	0 / 0
(c) Combination timber and roof bolts	0 / 67.7	0 / 100	0 / 100	25 / 0	100 / 0	33.33 / 0	50 / 0	0 / 0	0 / 0	8 / 3
(d) Self-supporting roof	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0	0 / 0

1. State	Kentucky	Kentucky	Kentucky	Kentucky	Kentucky	Kentucky	Kentucky	Kentucky	Kentucky	Kentucky
2. Mine	"A1"	"A2"	"A3"	"A4"	"A5"	"A6"	"A7"	"A8"	"A9"	"A10"
3. Coal seam	Elkhorn #3	Elkhorn #3	Elkhorn #3	Elkhorn #3	Elkhorn #3	Kellioka ("C")	Harlan or Marker "B"	High Splint	#3 Elkhorn	#9 West Kentucky
4. Thickness of coal seam	39" to 48"	39" to 70"	40" to 64"	33" to 43"	28" to 37"	60"	40"	66"	30"	54"
5. Immediate top	Slate, shale, and sandstone	Slate, shale, and sandstone	Slate, shale, and sandstone	Slate, shale, and sandstone	Slate, shale, and sandstone	Hard shale and sandstone	Hard shale and massive sandstone	Shale or laminated sandstone	Soft to firm shale	Hard gray shale
6. Secondary top	Mostly sandstone	Mostly sandstone	Mostly sandstone	Mostly sandstone	Mostly sandstone	Massive sandstone	Massive sandstone	Massive sandstone	Sandstone	White laminated shale
7. Type of bottom	Fireclay	Fireclay	Fireclay	Fireclay	Fireclay	Hard shale	Soft shale	Soft shale	Hard slate Sandstone	Fireclay
8. Overburden:										
(a) Maximum	600'	600'	600'	700'	800'	1,950'	2,000'	650'	1,200'	700'
(b) Minimum	0	0	0	0	0	Outcrop	Outcrop	Outcrop	330'	50'
(c) Average	300'	300'	300'	350'	350'	1,050'	1,100'	300'	900'	400'
9. System of mining	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Panel	Room-and-entry
10. What percentage of coal is mined on development or advance work?	29 to 34	29 to 34	51	34	34	55	65	60	65 to 70	50
11. Size of pillars in:	No pillar-pillar	No pillar-pillar		No pillar-pillar						
(a) Entries	32'x38'-48'x48'	33'x38'-48'x48'	48' x 48'	33'x38'-48'x48'	33' x 38'	62' x 62'	22' x 62'	57' x 62'	30' x 48'	40'
(b) Rooms	21'x43'-48'x53'	21'x43'-48'x53'	48' x 53'	21'x43'-48'x53'	21' x 43'	52' x 62'	15' x 62'	42' x 63'	10' x 48'	25'
(c) Retreat mining	Under pillar column	Under pillar column	-	Under pillar column	-	62' x 62'		57' x 62'	None	None
12. On what centers are:										
(a) Entries	40'-57'-60'x70'	40'-57'-60'x75'	60' and 70'	40'-57' 16'	40' x 57'	80'	40'	60' and 75'	60'	60'
(b) Rooms	45'-56'-50'x65'	45'-56'-50', 65',75'	65'	45'-56' 18'	45' x 56'	80'	40'	80' and 65'	50'	60'
(c) Breakthroughs	60' 70'	60' 70'	70'	60' 70'	60'	80'	80'	80' and 112'	60' x 80'	50'
(d) Pillar mining	-	-	-	-	-	80'	None	60' x 80'	None	None
13. Pillar mining:										
(a) Complete extraction .... percent	50	70	100	33	None	Complete extraction	-	Complete extraction	-	None
(b) Partial extraction .... do.	50	30	-	67	Partial extraction	-	Partial extraction		-	-
14. Width of places:	No pillar-pillar	No pillar-pillar		No pillar-pillar						
(a) Entries	15'-25' 16'	15'-25' 16'	16'	15-25' 16'	15' to 25'	18'	18'	18'	28' to 32'	16'
(b) Rooms	18'-33' 18'	18'-33' 18'	18'	25' to 33' 18'	25' to 33'	18'	25'	18'	30' to 42'	26' to 30'
(c) Breakthroughs	16' 16'	16' 16'	16'	16' 16'	16'	18'	18'	18'	60' to 80'	16'
(d) Open-end cutovers	21' avg.	21' avg.	21' avg.	-	-	25'	-	20' - 22'	12'	-
(e) Pocket and wing:										
1. Pocket	-	-	-	-	-	-	-	18'	None	-
2. Wing	-	-	-	-	-	-	-	12'	-	-
15. Roof bolting - concurrent or subsequent to face mining?	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent
(a) Timbering concurrent or subsequent to face mining?	do.	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent
16. Roof-support development:										
(a) Bolts	-	Bolts	Bolts	Bolts	Bolts	Bolts	Bolts	Bolts	Bolts	Bolts
(b) X-bars	X-bars	X-bars	-	-	-	-	-		X-bars	X-bars
(c) Posts	Posts	Posts	Posts	-	Posts	Posts	Posts		Posts	-
(d) Bolts and x-bars	Bolts and x-bars	Bolts and x-bars	-	-	-	-	-	Bolts and x-bars	Bolts and x-bars	-
(e) Bolts and posts	Bolts and posts	Bolts and posts	Bolts and posts	Bolts and posts	Bolts and posts	-	Bolts and posts	-	Bolts and posts	-
(f) Self-supporting	-	Self-supporting	Self-supporting	Self-supporting	Self-supporting	-	-	-	-	-
17. Roof support - retreat mining:										
(a) Bolts	-	Bolts	Bolts	Bolts	Bolts	Bolts	No retreat mining	Bolts	None	None
(b) X-bars	X-bars	X-bars	-	-	-	-			-	-
(c) Posts	Posts	Posts	Posts	Posts	Posts	Posts	-	Posts	-	-
(d) Bolts and x-bars	Bolts and x-bars	Bolts and x-bars	-	-	-	-	-		-	-
(e) Bolts and posts	Bolts and posts	Bolts and posts	Bolts and posts	Bolts and posts	Bolts and posts	Bolts and posts	-	Bolts and posts	-	-
(f) Self-supporting	-	Self-supporting	Self-supporting	Self-supporting	Self-supporting		-	-	-	-
18. Roof-bolt anchorage:										
(a) Massive rock	-		Massive rock	Massive rock	Massive rock	Massive rock	Massive rock	Massive rock	Massive rock	Massive rock
(b) Laminated shale	Laminated shale	Shale	Laminated shale	Laminated shale	Laminated shale	-		-	Shale	-
(c) Coal	-		-	-	-	-		-	-	-
(d) Other	-	Weak slate	-	-	-	-		-	-	-
19. Do you have a standard roof-support plan?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20. If available, attach a roof-support plan	No	No	No	No	No	Yes	Yes	Yes	Yes	No
21. What percentage of accidents occurred from falls of roof, sides, or face?										
1955	60	43	20	33.3	33.3	50	None	0	None	19
1956	None	None	50	20	None	25	33	43	None	11
22. What percentage of roof-fall accidents occurred within 25 ft. of working face?										
1955	67	67	100	None	50	67	0	0	0	100
1956	0	0	100	100	None	25	0	100	0	100
23. What percentage of roof-fall accidents occurred where roof-support plan was not followed?										
1955	None	33	100	None	None	67	0	0	0	0
1956	0	0	None	None	None	100	100	67	0	0
24. Where roof supports are used, what percentage of roof-fall accidents occurred inby last roof support?										
1955	None	None	None	None	50	0	0		0	0
1956	0	0	100	100	None	0	0	67	0	0
25. What percentage of roof-fall accidents occurred in -										
(a) Advance or development mining -										
1955	67	33	100	100	100	100	0	0	0	100
1956	0	0	100	0	0	100	0	33	0	100
(b) Pillar or retreat mining -										
1955	33	67	0	0	0	0	0	0	0	0
1956	0	0	0	100	0	0	0	67	0	0
26. What percentage of roof-fall accidents occurred in following areas:	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956
(a) Roof-bolted area	- -	- -	- -	- -	- -	- -	- -	- 67	- -	100 100
(b) Timbered area	33 -	100 -	100 100	100 100	100 -	100 100	- 100	-	- -	0 0
(c) Combination timber and roof bolts	67 -	- -	- -	- -	- -	- -	- -	- 33	- -	0 0
(d) Self-supporting roof	- -	- -	- -	- -	- -	- -	- -	-	- -	0 0

1. State	West Virginia	West Virginia	West Virginia	West Virginia	West Virginia	West Virginia	West Virginia	West Virginia	West Virginia	West Virginia
2. Mine	"F1"	"F2"	"F3"	"F4"	"F5"	"F6"	"F7"	"F8"	"F9"	"F10"
3. Coal seam	Sewell	Campbell Creek	Eagle	Hernshaw	Pocahontas #4	Pittsburgh	Hernshaw	Pocahontas #3	Pocahontas #3	Pocahontas #3
4. Thickness of coal seam	60"	56" to 96"	42"	42"	39"	100"	38"	60"	7'	52"
5. Immediate top	Slate and shale	Coal and shale	Rash (laminated coal)	Slate or sandstone	Shale	Draw slate	Slate and sandstone	Draw slate	Slate	Slate
6. Secondary top	Slate or sandstone	Shale	Shale	do.	Sandstone	Shale	Sandstone	Black shale	Sandstone	Sandstone
7. Type of bottom	Fireclay	do.	do.	do.	Slate	Fireclay	Shale	Slate	Soft shale	Slate
8. Overburden:										
(a) Maximum	600'	1,200'	1,500'	1,000'	900'	876'	700'	900'	700'	750'
(b) Minimum	60'	100'	100'	70'	60'	250'	100'	300'	500'	28'
(c) Average	350'	700'	1,000'	250'	500'	455'	450'	700'	600'	500'
9. System of mining	Room-and-pillar	Entries and rooms- Partial mining	Room	Entries Wide rooms	Semilongwall	Panel	Entry-and-room	Room-and-pillar	Room-and-pillar	Room-and-pillar
10. What percentage of coal is mined on development or advance work?	30	10	10	10	40	32	15	42	All retreat mining	27
11. Size of pillars in:										
(a) Entries	55' x 79'	70' x 65'	55'x80' - 25'x48'	55'x80' - 25'x48'	46'x82' - 56'x82'	75'x75' - 70'x59' 70' x 67'	46'x74' - 36'x54'	54' x 79'	60' x 80'	60'x90' - 70'x90'
(b) Rooms	55' x 79'	8' x 76'	18' x 65'	5' x 50'	-	-	7' to 9' x 50'	42'x52' - 78'x78'	60' x 80'	70' x 90'
(c) Retreat mining	55' x 79'	Rooms on retreat mining	Rooms only	Rooms only	340' x 1,850'	-	-	-	60' x 80'	70' x 90'
12. On what centers are -										
(a) Entries	70'	80'	60' - 45'	60' - 40'	60' x 50'	90'-70'-72'-78'	60' - 50'	70	75'	60' - 75'
(b) Rooms	95'	28'	65'	32'	-	90'-70'-18'	35',45',52' and 70'	95' and 60'	75'	70'
(c) Breakthrough	95'	84'	80'	64' - 80'	96'	90'-70'-83'	90'-52'-70'	95' and 70'	80'	90'
(d) Pillar mining	95'	(None) (Rooms)	-	-	-	90'-70'-83'	-	60'-70'-95'	-	90'
13. Pillar mining:										
(a) Complete extraction	Complete extraction	-	-	-	Complete extraction	Complete extraction	No pillar mining	Complete extraction	Complete extraction	Complete extraction
(b) Partial extraction	-	Partial extraction	-	Main-entry pillars	-	Partial extraction	-	-	-	-
14. Width of places:										
(a) Entries	16'	15' - 16'	15'-16'-18'	14' - 16'	14'	15' - 13'	14' - 20'	16' - 17'	16'	16'
(b) Rooms	16'	20'	47'	16' - 25'	-	15' - 13'	26',28',40' and 50'	18'	16'	16'
(c) Breakthroughs	16'	16'	14'	16'	14'	15' - 13'	14' - 16'	16'	16'	16'
(d) Open-end cutovers	18'	-	-	-	326'	-	-	18'	20'	20'
(e) Pocket and wing:										
1. Pocket	-	20'	-	-	-	-	-	-	14'	14'
2. Wing	-	20'	-	-	-	-	-	-	8'	20'
15. Roof bolting - concurrent or subsequent to face mining?	Prior	Concurrent and subsequent	Subsequent	Prior	-	Prior	Subsequent	Subsequent	-	Concurrent
(a) Timbering concurrent or subsequent to face mining?	Concurrent	Subsequent	do.	do.	-	Prior and concurrent	Concurrent and subsequent	Concurrent	Concurrent	do.
16. Roof-support development:										
(a) Bolts	Bolts	Bolts	Bolts	Bolts	Bolts	Bolts	-	Bolts	Bolts	Bolts
(b) X-bars	X-bars	X-bars	When needed	X-bars	-	X-bars	X-bars	X-bars	X-bars	-
(c) Posts	Posts	Posts	Posts	Posts	Posts	-	Posts	-	-	Posts
(d) Bolts and x-bars	Bolts - X-bars	Bolts - X-bars	When needed	Bolts - X-bars	-	Bolts - X-bars	Bolts - X-bars	Bolts - X-bars	-	-
(e) Bolts and posts	Bolts - Posts	-	-	Bolts - Posts	-	Posts - Bolts	Bolts - Posts	-	-	Bolts - Posts
(f) Self-supporting	-	-	-	-	-	Cont. miner	Narrow entries	-	-	-
17. Roof support - retreat mining:										
(a) Bolts	-	-	-	Bolts	-	-	-	-	-	Bolts
(b) X-bars	X-bars	X-bars	Some posts	X-bars	-	X-bars	-	X-bars	X-bars	X-bars
(c) Posts	Posts	Posts		Posts	-	Posts	Posts	-	-	Posts
(d) Bolts and x-bars	-	-	-	Bolts - X-bars	-	-	Bolts - X-bars	Bolts - X-bars	-	-
(e) Bolts and posts	-	-	-	Bolts - posts	Steel jacks and steel X-bars	Bolts - Posts	Bolts - Posts	-	-	Bolts - Posts
(f) Self-supporting	-	-	-	-		Cont. miner	-	-	-	-
18. Roof-bolt anchorage:										
(a) Massive rock	Massive rock	-	-	Massive rock	Massive rock	-	Massive rock	-	-	Massive rock
(b) Laminated shale	Shale	Shale	Shale	Shale	Shale	Shale	Shales	Shales	-	Shale
(c) Coal	-	-	-	-	-	-	-	-	-	-
(d) Other	-	-	-	-	-	-	-	-	Slate-sandstone	-
19. Do you have a standard roof-support plan?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20. If available, attach a roof-support plan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
21. What percentage of accidents occurred from falls of roof, sides or face?										
1955	33.3	23.1	33.4	6.5	22.2	12.5	28.5	33.9	18	10
1956	33.3	32.4	24.4	27.6	12.5	19	5.7	29.7	20	10
22. What percentage of roof-fall accidents occurred within 25 ft. of working face?										
1955	50	66.6	90.9	50	100	75	100	89.5	75	80
1956	100	81.8	80.0	75	100	62.5	100	100	80	80
23. What percentage of roof-fall accidents occurred where roof-support plan was not followed?										
1955	0	16.6	9.1	0	0	0	12.5	21.1	0	0
1956	100	9.1	20.0	0	0	12.5	50	9.1	0	0
24. Where roof supports are used, what percentage of roof-fall accidents occurred inby last roof support?										
1955	25	50.0	18.2	0	0	0	12.5	26.3	12	5
1956	66	27.3	30	12.5	0	25	50	18.2	12	5
25. What percentage of roof-fall accidents occurred in -										
(a) Advance or development mining -										
1955	50	33.6	9.1	50	50	100	0	42.1	10	40
1956	66.7	45.5	50	0	0	25	0	100	10	45
(b) Pillar or retreat mining -										
1955	50	66.6	90.9	50 Rooms on	50	-	100 Rooms on	57.9	90	60
1956	33.3	54.5	50	100 retreat	100	75	100 retreat	0	90	55

26. What percentage of roof-fall accidents occurred in following areas? -	1955	1956	1955	1956	1955	1956	1955	1956	1955	1956
(a) Roof-bolted area	0	33	16.7	0	9.1	10.0	0	0	0	0
(b) Timbered area	100	67	83.3	81.8	81.8	60.0	0	12.5	100	100
(c) Combination timber and roof bolts	0	0	0	18.2	9.1	30	100	87.5	0	0
(d) Self-supporting roof	0	0	0	0	0	0	0	0	0	0

26. (continued)	1955	1956	1955	1956	1955	1956	1955	1956	1955	1956
(a) Roof-bolted area	100	62.5	0	0	10.6	45.5	0	20	30	35
(b) Timbered area		25	50	50	68.2	-	0	80	40	40
(c) Combination timber and roof bolts	-	-	50	50	21.2	54.5	0	0	30	25
(d) Self-supporting roof	0	12.5	0	0	0	0	0	0	0	0

1. State	Virginia	Virginia	Virginia	Virginia	Virginia	Virginia	Virginia	Virginia	West Virginia	West Virginia
2. Mine	"11"	"12"	"13"	"14"	"15"	"16"	"17"	"18"	"19"	"110"
3. Coal seam	Pocahontas #3	Imboden	Imboden	Marker	Cary	Imboden	Taggart	Taggart	Beckley	Pocahontas #3
4. Thickness of coal seam	10'	72"	82"	40"	50"	65"	52"	70"	48"	48"
5. Immediate top	Slate	Hard bone slate	Soft draw slate	Sandstone	Fragile shale	Soft slate	Hard slate	Sandstone	Shale sandstone	Slate sandstone
6. Secondary top	Shale sandstone	Soft slate	Hard slate Sandstone	Sandstone	Shale sandstone	Sandstone	Sandstone	do.	do.	Sandstone
7. Type of bottom	Fireclay	Hard slate	Soft and hard slate	Hard slate	Slate	Medium slate	Fire clay Soft slate	Hard slate	Shale	Shale
8. Overburden:										
(a) Maximum	500'	1,200'	500'	1,500'	-	1,700'	1,300'	900'	500'	850'
(b) Minimum	180'	20'	20'	20'	-	20'	20'	20'	0	100'
(c) Average	400'	600'	250'	800'	-	800'	650'	400'	250'	400'
9. System of mining	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar
10. What percentage of coal is mined on development or advance work?	None	New mine 100	63	36.6	40	59	67	0	30	40
11. Size of pillar in:										
(a) Entries	None	34'x64' - 34'x56'	34'x64' - 34'x56'	29'x61' - 29'x79'	-	34'x64' - 34'x56'	34'x44' - 34'x64' 34'x59'	Various	50' x 80'	60' x 80'
(b) Rooms	60' x 60'	16' x 44'	16' x 44'	15'x54' - 20'x84'	50' x 60'	16' x 44'	34'x44' - 34'x59'	54' x 64'	50' x 80'	55' x 80'
(c) Retreat mining	-	16' x 14'	Pillars not mined	Split entry pillars	-	16' x 14'	-	-	50' x 80'	55' x 80'
12. On what centers are:										
(a) Entries	75'	50'	50'	50'	-	50'	50'	70'	70'	80'
(b) Rooms	75'	36'	36'	40' - 80'	60'	36'	50' - 75'	70' - 80'	70'	75'
(c) Breakthroughs	75'	80'-72'-60'	80'-72'-60'	70' - 100'	70'	80'-72'-60'	60'-75'-80'	80'	70' - 100'	100'
(d) Pillar mining	75'	Room pillars split	Room pillars split	None	-	Room pillars split	-	-	70' - 100'	100'
13. Pillar mining:										
(a) Complete extraction	Complete	-	-	-	Complete extraction	-	Complete	Complete	85% Complete extraction	Complete extraction
(b) Partial extraction	-	Room pillars split	Room pillars split	-	-	Room pillars not mined	-	-	15% Partial	-
14. Width of places:										
(a) Entries	16'	16'	16'	12' - 21'	-	16'	16'	16' - 20'	12'	16'
(b) Rooms	16'	16'	16'	25' - 60'	24'	16'	16'	16' - 20'	20'	20'
(c) Breakthroughs	16'	16'	16'	21'	18'	16'	16'	16' - 20'	18'	18'
(d) Open-end cutovers	16'	-	-	-	-	-	-	16' - 20'	18'	20'
(e) Pocket and wing:										
1. Pocket	16'	-	-	-	-	-	-	-	20'	18'
2. Wing	16'	-	-	-	-	-	-	-	20'	22'
15. Roof bolting - concurrent or subsequent to face mining?	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	-	Main entries subsequent	Concurrent
(a) Timbering concurrent or subsequent to face mining?	Subsequent	Subsequent	do.	do.		Subsequent	do.	Concurrent	Concurrent	do.
16. Roof-support development:										
(a) Bolts	None	-	-	Bolts		Bolts	Bolts	-	Bolts	Bolts
(b) X-bars	-	-	-	X-bars		X-bars	X-bars	X-bars	X-bars	-
(c) Posts	-	-	-	Posts		Posts	Posts	Posts	Posts	Posts
(d) Bolts and x-bars	-	-	-	Bolts - X-bars		Bolts - X-bars	-	-	-	-
(e) Bolts and Posts	-	Bolts - Posts	Bolts - Posts	Bolts - Posts	Bolts - Posts	Bolts - Posts	Bolts - Posts	-	-	-
(f) Self-supporting	-	-	-	Self-supporting	-	-	-	-	-	-
17. Roof support - retreat mining:										
(a) Bolts	Bolts	None	-	None	-	None	-	-	-	-
(b) X-bars	-	-	-	-	-	-	-	X-bars	X-bars	-
(c) Posts	-	-	Posts	-	-	-	-	Posts	Posts	-
(d) Bolts and x-bars	Bolts - X-bars	-	-	-	Bolts - X-bars	-	Bolts - X-bars	-	-	-
(e) Bolts and posts	-	-	-	-	Bolts - Posts	-	Bolts - Posts	-	-	Bolts - Posts
(f) Self-supporting	-	-	-	-	-	-	-	-	-	-
18. Roof bolt anchorage -										
(a) Massive rock	Massive rock	Massive rock	Massive rock	Massive rock	Massive rock	Massive rock	Massive rock	No bolting	Massive rock	Massive rock
(b) Laminated shale	-	-	-	-	-	-	-	-	-	-
(c) Coal	-	-	-	-	-	-	-	-	-	-
(d) Other	-	Firm shale	Firm shale	Firm shale	-	Firm shale	Firm shale	-	-	-
19. Do you have a standard roof-support plan?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20. If available, attach a roof-support plan	No	Yes	Yes	Yes	-	Yes	Yes	Yes	Yes	Yes
21. What percentage of accidents occurred from falls of roof, sides, or face?										
1955	60	None	58	13.8	Information not available for 1955	Information not available for 1955	23.8	9.1	12	22
1956	60	None	46.6	34.6	43	50	4.5	9.5	7	27
22. What percentage of roof-fall accidents occurred within 25 ft. of working face?										
1955	90	0	100	75	-	-	100	50	100	83
1956	90	0	100	87.5	43	83.4	100	100	50	100
23. What percentage of roof-fall accidents occurred where roof-support plan was not followed?										
1955	0	0	66.6	50	-	-	75	50	100	75
1956	0	0	50	87.5	5	60	100	100	50	80
24. Where roof supports are used, what percentage of roof-fall accidents occurred inby last roof support?										
1955	5	0	66.6	75	-	-	66.6	50	0	75
1956	5	0	50	71.5	5	75	100	100	50	75
25. What percentage of roof-fall accidents occurred in -										
(a) Advance or development mining -										
1955	0 0	0	100	100	-	-	100	0	100	60
1956	0	0	100	100	35	100	100	0	50	50
(b) Pillar or retreat mining -										
1955	60	0	0	0	-	-	0	100	0	40
1956	60	0	0	0	65	-	0	100	50	50
26. What percentage of roof-fall accidents occurred in following areas? -	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956
(a) Roof bolted area	0 0	0 0	100 100	0 0	- -	- 100	100 100	0 0	- -	75 50
(b) Timbered area	40 40	0 0	0 0	100 90	- -	- 0	0 0	100 100	100 100	- -
(c) Combination timber and roof bolts	60 60	0 0	0 0	- 0	- 100	- 0	0 0	0 0	- -	25 50
(d) Self-supporting roof	0 0	0 0	0 0	0 10	- 0	- 0	0 0	0 0	- -	- -

1. State	West Virginia	West Virginia	West Virginia	West Virginia	West Virginia	West Virginia	West Virginia	West Virginia	West Virginia	West Virginia
2. Mine	"J1"	"J2"	"J3"	"J4"	"J5"	"J6"	"J7"	"J8"	"J9"	"J10"
3. Coal seam	Pocahontas #4	Beckley	Bradshaw	Cedar Grove	Lower Cedar Grove	Powelton	Upper Cedar Grove	Upper and Lower Chilton	Lower Cedar Grove	Lower Cedar Grove
4. Thickness of coal seam	68"	42"	42"	38" to 70"	60"	38"	40"	40" - 50"	60"	60"
5. Immediate top	Firm shale	Laminated shale	Blue shale	Grey shale	Laminated shale	Draw slate	Blue slate	Laminated shale	Mixture of coal - slate	Shale
6. Secondary top	Massive sandstone	Sandy shale	Blue shale	-	Sandstone	Sandstone	Sandstone	Sandstone	Sandstone	Sandstone
7. Type of bottom	Slate	Slate	Slate	Soft slate	Soft slate	Soft shale	Hard shale	Soft shale	Soft slate	Soft slate
8. Overburden:										
(a) Maximum	850'	600'	-	2,000'	500'	600'	400'	325'	500'	1,100'
(b) Minimum	550'	100'	-	30'	100'	40'	50'	40'	100'	130'
(c) Average	600'	400'	-	-	350'	300'	250'	175'	350'	800'
9. System of mining	Room-and-pillar	Entry	Room-and-pillar	Room-and-pillar	Panel	Entries and rooms	Panel	Rooms and entries	Panel	Panel
10. What percentage of coal is mined on development or advance work?	25	50	60	30	100	60	65	60	65	65
11. Size of pillars in:										
(a) Entries	-	60' x 50'	-	30' x 60'	60' x 30'	35' x 60'	60' x 30'	30' x 60'	30' x 50'	26' x 56'
(b) Rooms	60' x 60'	-	40' x 60'	15' x 60'	50' x 16'	30' x 40'	50' x 16'	20' x 40'	12' x 40'	14' x 60'
(c) Retreat mining	-	-	-	15' x 30'	-	-	-	-	-	-
12. On what centers are:										
(a) Entries	85'	70'	60'	50'	50'	60'	50' - 60'	50'	50'	50'
(b) Rooms	-	-	-	50'	40'	50' - 60'	40'	45'	40'	40'
(c) Breakthroughs	-	70'	80'	80'	80' - 70'	60' - 80'	80' - 70'	60'	80'-60' to 70'	80'
(d) Pillar mining	-	-	-	-	-	-	-	-	-	-
13. Pillar mining:										
(a) Complete extraction	Complete extraction	-	Complete extraction	-	-	-	-	-	-	-
(b) Partial extraction	-	Partial extraction	-	Partial extraction	Partial mining	Partial mining	-	-	-	-
14. Width of places:										
(a) Entries	-	20'	24'	20'	22'	24'	22'	20'	22'	24'
(b) Rooms	20'	-	-	24'	24'	30'	24'	24'	24'	26'
(c) Breakthroughs	20'	10'	-	20'	20'	20'	20'	20'	20'	20'
(d) Open-end cutovers		-	20'		-	-	-	-	-	
(e) Pocket and wing:										
1. Pocket	20'	-	-	24'	-	-	-	-	-	-
2. Wing	-	-	-	-	-	-	-	-	-	-
15. Roof bolting - concurrent or subsequent to face mining?	Spot bolting	Concurrent	Spot bolting	Subsequent	-	Subsequent	-	Subsequent	Subsequent	Concurrent
(a) Timbering concurrent or subsequent to face mining?	-	-	-	do.	Subsequent	do.	Concurrent	do.	-	do.
16. Roof-support development:										
(a) Bolts	-	Bolts	-	-	-	-	-	-	Bolts	Bolts
(b) X-bars	X-bars	-	-	-	X-bars	-	-	-	-	X-bars
(c) Posts	Posts - Cribs	Posts	Posts	Posts	Posts	Posts	Posts	-	Posts	Posts
(d) Bolts and x-bars	-	-	-		-	Bolts - X-bars	-	Bolts - X-bars	-	Bolts - X-bars
(e) Bolts and Posts	-	-	-		-	-	-	Bolts - Posts	Bolts - Posts	Bolts - Posts
(f) Self-supporting	-	-	-	Self-supporting	-	-	-	-		-
17. Roof support - retreat mining:										
(a) Bolts		No pillar	-	-	No pillar	No pillar	-	No pillar	No pillar	No pillar
(b) X-bars	X-bars	Work	-	X-bars	Work	Work	-	Work	Work	Mining
(c) Posts	Posts - Cribs	-	-	Posts	-	-	Posts	-	-	-
(d) Bolts and x-bars	-	-	-	-	-	-	-	-	-	-
(e) Bolts and Posts	-	-	Bolts - Posts	-	-	-	-	-	-	-
(f) Self-supporting	-	-	-	-	-	-	-	-	-	-
18. Roof-bolt anchorage:										
(a) Massive rock	Massive rock	-	Massive rock	Massive rock	-	Massive rock	-		Massive rock	Massive rock
(b) Laminated shale	-	Laminated shale	-	-	-	Laminated shale	-		-	Shale
(c) Coal	-	-	-	-	-	-	-		-	-
(d) Other	-	-	-	-	-	-	-		-	-
19. Do you have a standard roof-support plan?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20. If available, attach a roof-support plan.	No	No	No	No	No	Yes	No	Yes	No	No
21. What percentage of accident occurred from falls of roof, sides, or face?										
1955	No report	No report	No report	1	No report	No report	No report	No report	No report	No report
1956	18	20	10	2	None	29	None	18	12.5	15.6
22. What percentage of roof-fall accidents occurred within 25 ft. of working face?										
1955	0	0	0	33.3	0	0	0	0	0	0
1956	100	100	50	100	0	50	0	50	100	100
23. What percentage of roof-fall accidents occurred where roof-support plan was not followed?										
1955	0	0	0	0	0	0	0	0	0	0
1956	100	0	100	20	0	50	0	50	0	50
24. Where roof supports are used, what percentage of roof-fall accidents occurred inby last roof support?										
1955	0	0	0	0	0	0	0	0	0	0
1956	100	0	0	100	0	0	0	0	0	0
25. What percentage of roof-fall accidents occurred in -										
(a) Advance or development mining -										
1955	0	0	0	33.3	0	0	0	0	0	0
1956	25	100	100	0	0	100	0	100	100	100
(b) Pillar or retreat mining -										
1955	0	0	0	66.7	0	0	0	0	0	0
1956	75	0	0	100	0	0	0	0	0	0
26. What percentage of roof-fall accidents occurred in following areas -	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956
(a) Roof-bolted area	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0
(b) Timbered area	0 100	0 0	0 100	100 100	0 0	0 0	0 0	0 0	0 0	0 0
(c) Combination timber and roof bolts	0 0	0 100	0 0	0 0	0 0	0 100	0 0	0 100	0 100	0 100
(d) Self-supporting roof	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0

1. State	West Virginia	West Virginia	West Virginia	West Virginia	West Virginia	West Virginia	West Virginia	West Virginia	West Virginia	West Virginia
2. Mine	"K1"	"K2"	"K3"	"K4"	"K5"	"K6"	"K7"	"K8"	"K9"	"K10"
3. Coal seam	Lower Cedar Grove	Lower Cedar Grove	Cedar Grove	Eagle	Pocahontas #3 and #6	Sewell	Sewell	Pocahontas #3	Pocahontas #3 and #4	Pocahontas #3-#1
4. Thickness of coal seam	64"	66"	40" to 52"	47"	34" to 60"	28" to 32"	28" to 36"	5' 2"	4' - 5'	5' - 28" to 37"
5. Immediate top	Shale	Shale	Shale	Shale Sandstone	Shale	Laminated Sandstone Shale	Slate Shale	Slate	Shale	Sandstone Draw slate
6. Secondary top	Shale to sandstone	Sandstone	Shale and sandstone	do.	Sandy shale	Sandstone	Sandstone	do.	do.	Sandstone
7. Type of bottom	Soft slate	Soft slate	Soft slate	Soft slate	Fireclay	Soft shale	Soft shale	Rock	Fireclay	Sandstone Fireclay
8. Overburden:										
(a) Maximum	1,100'	1,100'	900'	1,100'	700'	800'	700'	300'	1,000'	300' - 400'
(b) Minimum	126'	130'	130'	50'	250'	100'	130'	100'	1,000'	600' - 400'
(c) Average	800'	800'	650'	700'	400'	400'	300'	150'	-	400' - 250'
9. System of mining	Panel	Panel	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room and entries	Room and entries	Room-and-pillar	Room-and-pillar	Room-and-pillar
10. What percentage of coal is mined on development or advance work?	65	65	45	52	45	60	60	None	80	60 to 70
11. Size of pillars in:										
(a) Entries	36' x 56'	36' x 56'	35' x 60'	26' x 60'	40' x 80'	32' x 60'	60' x 40'	70' x 45'	40' x 60'	40' x 30'
(b) Rooms	24' x 60'	25' x 55'	25' x 50'	22' x 56'	20' x 80'	20' x 40'	40' x 30'	70' x 45'	40' x 60'	38' x 20'
(c) Retreat mining	None	None	10' - 30'	-	-	-	-	70' x 45'	40' x 60'	45' x 50'
12. On what centers are:										
(a) Entries	50' - 60'	60' - 70'	60'	50'	60'	60'	60' and 65'	60'	60' - 70'	65'
(b) Rooms	50'	50'	50'	50'	50'	60'	60'	65'	60' - 70'	45'
(c) Breakthroughs	80'	70' - 80'	80'	80'	80'	60' - 80'	80'	70'	80'	60'
(d) Pillar mining	None	None	-	-	-		-	70'	80'	65' and 75'
13. Pillar mining:										
(a) Complete extraction	-	-	-	-	Complete extraction	-	-	Complete extraction	Complete extraction	Complete extraction
(b) Partial extraction	-	-	Partial extraction	Partial extraction	-	-	-	-	-	-
14. Width of places:										
(a) Entries	24'	24'	20'-22'-24'	24'	20'	28'	28'	20'	16'	20' - 25'
(b) Rooms	26'	30'	28'	28'	20'	35' to 45'	35' - 40'	20'	18'	24' - 28'
(c) Breakthroughs	20'	20'	-	24'	16'	20'	20'	20'	18'	24'
(d) Open-end cutovers	-	-	-	-	20'	-	-	55'	20'	-
(e) Pocket and wing:										
1. Pocket	-	-	-	-	-	-	-	-	20'	-
2. Wing	-	-	-	-	-	-	-	-	20'	-
15. Roof bolting - concurrent or subsequent to face mining?	Concurrent	Concurrent	Subsequent	Subsequent	Subsequent	None	None	None	Concurrent	-
(a) Timbering concurrent or subsequent to face mining?	do.	do.	do.	do.	do.	Subsequent	Subsequent	Subsequent	do.	Subsequent
16. Roof-support development:										
(a) Bolts	Bolts	Bolts	-	-	Bolts	-	-	No development Work	Bolts	-
(b) X-bars	X-bars	X-bars	-	-	-	-	-		X-bars	-
(c) Posts	Posts	Posts	-	-	Posts	Posts	Posts	-	Posts	-
(d) Bolts and x-bars	Bolts - X-bars	Bolts - X-bars	Bolts - X-bars	-	Bolts - X-bars	-		-	Bolts - X-bars	-
(e) Bolts and posts	Bolts - Posts	Bolts - Posts	Bolts - Posts	Bolts - Posts	Bolts - Posts	-		-	Bolts - Posts	-
(f) Self-supporting	-	-	-	-	-	-		-	-	-
17. Roof support - retreat mining:										
(a) Bolts	No pillar Mining	No pillar Mining	-	-	-	No pillar Mining	No pillar Mining	-	Bolts	-
(b) X-bars			-	-	-			-	X-bars	-
(c) Posts	-	-	-	-	-	-	-	Posts	Posts	-
(d) Bolts and x-bars	-	-	Bolts - X-bars	-	Bolts - X-bars	-	-	-	Bolts - X-bars	-
(e) Bolts and posts	-	-	Bolts - Posts	Bolts - Posts	Bolts - Posts	-	-	-	Bolts - Posts	-
(f) Self-supporting	-	-	-	-	-	-	-	-	-	-
18. Roof-bolt anchorage:										
(a) Massive rock	Massive rock	Massive rock	Rock	-	Massive rock	No roof Bolting	No roof Bolting	No roof Bolting	Massive rock	-
(b) Laminated shale	Shale	Shale	Shale	Shale	Shale				Shale	-
(c) Coal	-	-	Coal	-	-	-	-	-	-	-
(d) Other	-	-	-	-	-	-	-	-	-	-
19. Do you have a standard roof-support plan?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20. If available, attach a roof-support plan.	Yes	Yes	No	No	No	Yes	Yes	No	No	No
21. What percentage of accidents occurred from falls of roof, sides, or face?										
1955	No report	No report	1	4	50	61	No report	44	Information not available for 1955	Information not available for 1955
1956	33.3	14.3	9	4	60	43	46	0	30	40
22. What percentage of roof-fall accidents occurred within 25 ft. of working face?										
1955	0	0	100	100	Remainder of information not available	83	-	22	-	-
1956	100	100	100	100	do.	100	8	0	25	0
23. What percentage of roof-fall accidents occurred where roof-support plan was not followed?										
1955	0	0	0	0	do.	17	-	0	-	-
1956	50	50	0	0	do.	0	0	0	0	0
24. Where roof supports are used, what percentage of roof-fall accidents occurred inby last roof support?										
1955	0	0	0	0	do.	0	-	22	-	-
1956	100	500	0	0	do.	0	-	0	5	50
25. What percentage of roof-fall accidents occurred in -										
(a) Advance or development mining -										
1955	0	0	100	0	do.	100	-	0	-	-
1956	100	100	100	0	do.	100	100	0	70	33.3
(b) Pillar or retreat mining -										
1955	0	0	0	0	do.	0	-	100	-	-
1956	0	0	0	0	do.	0	0	0	30	66.6

26. What percentage of roof-fall accidents occurred in the following areas -	1955	1956	1955	1956	1955	1956	1955	1956	1955	1956	1955	1956	1955	1956	1955	1956	1955	1956	1955	1956
(a) Roof-bolted area	0	0	0	0	0	0	0	0	do.	do.	0	0	-	0	0	0	-	20	-	10
(b) Timbered area	0	100	0	100	0	0	0	0	do.	do.	100	100	-	100	100	0	-	80	-	90
(c) Combination timber and roof bolts	0	0	0	0	100	100	100	100	do.	do.	0	0	-	-	0	0	-	-	-	0
(d) Self-supporting roof	0	0	0	0	0	0	0	0	do.	do.	0	0	-	-	0	0	-	-	-	0

1. State	Nova Scotia Canada	Illinois	Illinois	Illinois	Wyoming	West Virginia	West Virginia	West Virginia	Kentucky	Kentucky
2. Mine	"L1"	"L2"	"L3"	"L4"	"L5"	"L6"	"L7"	"L8"	"L9"	"L10"
3. Coal seam	Harbour	Illinois #6	Herrin #6	Herrin #6	Nos. 7, 7-1/2, 9 and 15	Pocahontas #3	Pocahontas #4	Pocahontas #3	Darby	High Splint
4. Thickness of coal seam	4.5' to 8'	7'	7' 3"	7'	4' to 14'	6'	6'	50"	32"	68"
5. Immediate top	Shale	Soft shale	Slate limestone	Slate	Shale	Slate Sandstone	Slate Sandstone	Shale sandstone	Sandstone	Slate sandstone
6. Secondary top	Shale and sandstone	do.	Limestone	Limestone	Shale sandstone	Sandstone	Sandstone	Slate shale	Shale	Sandstone
7. Type of bottom	Clay	Fireclay	Fireclay	Fireclay	Sandstone	do.	Slate sandstone	do.	Fireclay Sandstone	Slate
8. Overburden:										
(a) Maximum	1,000'	400'	-	-	800'	1,200'	1,000'	900'	1,000'	700'
(b) Minimum	300'	300'	-	-	35'	250'	100'	300'	0	20'
(c) Average	600'	350'	340'	720'	400'	650'	500'	600'	500'	350'
9. System of mining	Room-and-pillar Longwall	Room-and-pillar	Room-and-entry	Room-and-entry	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-entry	Room-and-pillar
10. What percentage of coal is mined on development or advance work?	11.1	60	50	50	10	40	-	35	50	61
11. Size of pillars in:										
(a) Entries	55' x 60'	35' x 35'	44' x 44'	44' x 44'	47' x 47'	75' x 90'	75' x 80'	75' x 60'	34' x 34'	44' x 59'
(b) Rooms	55' x 60'	30' x 30'	25' x 25'	25' x 25'	31' x 31'	75' x 90'	75' x 80'	75' x 60'	20' x 20'	44' x 59'
(c) Retreat mining	-	None	None	None	Variable	75' x 90'	55' x 60'	75' x 60'	None	44' x 59'
12. On what centers are:										
(a) Entries	73'	60'	70' - 60'	60'	60'	75'	75'	75'	50'	60'
(b) Rooms	75'	60'	50'	50'	55'	75'	75'	75'	50'	60'
(c) Breakthroughs	78'	60'	74'	74'	55'	90'	80'	75'	74'	75'
(d) Pillar mining	-	None	None	None	40'	75'	75'	90'	None	
13. Pillar mining:										
(a) Complete extraction	None	None	None	None	Complete extraction	Complete extraction	Complete extraction	Complete extraction	-	Complete extraction
(b) Partial extraction	None	-	-	None	-	-	-	-	-	-
14. Width of places:										
(a) Entries	14'	-	16'	16'	12' - 14'	16'	16'	16'	16'	16'
(b) Rooms	20'	-	24' - 28'	24' x 28'	20' - 30'	16'	18' - 20'	16'	30'	16'
(c) Breakthroughs	18'	-	16'	16'	12' - 14'	16'	16' - 18' - 20'	16'	16'	16'
(d) Open-end cutovers	-	-	None	None	-	20'	-	20'	-	-
(e) Pocket and wing:	-	-	None	-	-	-	-	-	-	-
1. Pocket	-	-	None	-	20' - 24'	-	-	-	-	-
2. Wing	-	-	None	-	20' - 24'	-	-	-	-	-
15. Roof bolting - concurrent or subsequent to face mining?	Concurrent	-	Concurrent	Concurrent	Concurrent	Concurrent	Concurrent	Subsequent	Concurrent	Concurrent
(a) Timbering concurrent or subsequent to face mining?	do.	-	do.	do.	do.		do.	do.	do.	do.
16. Roof-support development:										
(a) Bolts	Bolts	Bolts	-	-	Bolts	Bolts	Bolts	Bolts	Bolts	Bolts
(b) X-bars	-	Steel bars	-	-	X-bars	-	-	-	X-bars	X-bars
(c) Posts	Posts - Arching	Posts	-	-	Posts	Posts	Posts	Posts	-	Posts
(d) Bolts and x-bars	-	Bolts - X-bars	Bolts - X-bars	Bolts - X-bars	Bolts - X-bars	-	Bolts - X-bars	-	Bolts - X-bars	-
(e) Bolts and posts	Bolts - Posts	Bolts - Posts	-	-	Bolts - Posts	Bolts - Posts	Bolts - Posts	-	-	Bolts - Posts
(f) Self-supporting	-	-	-	-	Self-supporting	-	-	-	-	-
17. Roof support - retreat mining:										
(a) Bolts	Bolts	No pillar Mining	No pillar Mining	No pillar Mining	Bolts	Bolts	Bolts	Bolts	No pillar Mining	-
(b) X-bars	-				X-bars	-	X-bars	-		X-bars
(c) Posts	Posts - Arching	-	-	-	Posts	Posts	Posts	Posts	-	Posts
(d) Bolts and x-bars	-	-	-	-	Bolts - X-bars	-	-	-	-	-
(e) Bolts and posts	Bolts - Posts	-	-	-	Bolts - Posts	Bolts - Posts	Bolts - Posts	-	-	-
(f) Self-supporting	-	-	-	-	-	-	-	-	-	-
18. Roof-bolt anchorage:										
(a) Massive rock	-	-	Massive rock	Massive rock	Massive rock	-	Rock	Rock	Rock	Rock
(b) Laminated shale	Laminated shale	Soft shale	Shale	Shale	Shale	-	Shale	-	Shale	-
(c) Coal	-	-	-	-	-	-	-	-	-	-
(d) Other	-	-	-	-	-	Sandstone	Coal	-	-	-
19. Do you have a standard roof-support plan?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20. If available, attach a roof-support plan.	Yes	No	No	No	-	No	No	No	Yes	Yes
21. What percentage of accidents occurred from falls of roof, sides, or face?										
1955	24	3	14	11.6	11	20	12	25	26.5	0
1956	21	2	15	9.7	67	25	23	20	11.1	26.3
22. What percentage of roof-fall accidents occurred within 25 ft. of working face?										
1955	88	10	Information not available	10	100	80	75	90	7.83	0
1956	85.9	8	do.	9	100	70	80	90	10.34	75
23. What percentage of roof-fall accidents occurred where roof-support plan was not followed?										
1955	0	0	do.	25	0	0	0	0	14.7	0
1956	0	0	do.	25	0	0	0	0	11.1	100
24. Where roof supports are used, what percentage of roof-fall accidents occurred inby last roof support?										
1955	0	0	do.	5	0	15	5	10	8.7	0
1956	0	0	do.	5	0	15	5	10	0	75
25. What percentage of roof-fall accidents occurred in -										
(a) Advance or development mining -										
1955	33.3	100	do.	100	0	50	25	90	78.8	0
1956	33.3	100	do.	100	50	40	30	90	100	75
(b) Pillar or retreat mining -										
1955	67.7	0	do.	-	100	50	75	10	21.2	0
1956	67.7	0	do.	-	50	60	70	10	-	25

	"L1"		"L2"		"L3"		"L4"		"L5"		"L6"		"L7"		"L8"		"L9"		"L10"	
26. What percentage of roof-fall accidents occurred in following areas:	1955	1956	1955	1956	1955	1956	1955	1956	1955	1956	1955	1956	1955	1956	1955	1956	1955	1956	1955	1956
(a) Roof-bolted area			0	0	0	0	60	60	0	0	100	100	25	20	0	0	0	0	0	20
(b) Timbered area	85	85	0	0	82.8	71.4	0	0	100	100	0	0	50	70	100	100	94.1	76.9	0	80
(c) Combination timber and roof bolts	15	15	100	100	0	0	40	40	0	0	0	0	25	10	0	0	5.9	23.1	0	0
(d) Self-supporting roof			0	0	17.2	28.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1. State	Pennsylvania	Pennsylvania	Pennsylvania	West Virginia	Virginia	Virginia	Kentucky	West Virginia	West Virginia	West Virginia
2. Mine	"M1"	"M2"	"M3"	"M4"	"M5"	"M6"	"M7"	"M8"	"M9"	"M10"
3. Coal seam	Upper Freeport	Sewickley	Pittsburgh	Eagle	Jewell	Jewell	Leatherwood	Chilton	Chilton	Eagle
4. Thickness of coal seam	80"	54"	8'	54"	42"	40"	38" to 70"	57"	55"	5'
5. Immediate top	Laminated shale	Slate	Draw slate	Slate	Shale	Shale sandstone	Soft slate	Slate Sandstone	Shale Sandstone	Shale
6. Secondary top	Sandstone	Sandrock	Wild coal	Sandstone	Shale sandstone	Sandstone	Slate	Sandstone	Coal or sandstone	Slate sandstone
7. Type of bottom	Fireclay	Limestone	Fireclay	Fireclay	Fireclay	Slate	Soapstone	Fireclay	Fireclay	Slate
8. Overburden:										
(a) Maximum	600'	250'	350'	1,800'	500'	400'	400'	500'	-	1,000'
(b) Minimum	250'	40'	50'	300'	150'	150'	0	150'	-	125'
(c) Average	380'	150'	250'	1,100'	300'	250'	300'	325	-	560'
9. System of mining	Room-and-pillar	Block system	Block system	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar
10. What percentage of coal is mined on development or advance work?	15	40	35	55	50	60	50	50	-	50
11. Size of pillars in:										
(a) Entries	85'x85' - 35'x75'	34' x 84'	56' x 76'	60' x 40'	80' x 50'	30' x 60'	60' x 40'	30' x 60'	60' x 40'	40' x 70'
(b) Rooms	85' x 85'	34' x 84'	56' x 76'	60' x 35'	80' x 50'	30' x 60'	60' x 30'	30' x 60'	60' x 30'	40' x 70'
(c) Retreat mining	85' x 85'	34' x 84'	56' x 76'	-	-	30' x 60'	60' x 30'	-	-	40' x 70'
12. On what centers are:										
(a) Entries	100'	50'	70'	60' - 50'	60'	50'	60'	50'	60'	60'
(b) Rooms	100'	50'	70'	60'	60'	50'	50'	50'	50'	60'
(c) Breakthroughs	100'	100'	90'	80'	80'	80'	80'	80'	30'	90'
(d) Pillar mining	100'	100'	70'	-	45'	-	-	-	-	-
13. Pillar mining:										
(a) Complete extraction	Complete extraction	Complete extraction	Complete extraction	Complete extraction	Complete extraction	Complete extraction	-	Complete extraction	Complete extraction	Complete extraction
(b) Partial extraction	-	-	-	-	-	-	Partial extraction	-	-	-
14. Width of places:										
(a) Entries	15'	15'	14'	20'	20'	22'	20'	20'	20'	20'
(b) Rooms	15'	16'	14'	22'	20'	22'	22'	22'	22'	20'
(c) Breakthroughs	15'	16'	14'	20'	18'	18'	18'	20'	20'	20'
(d) Open-end cutovers	15'	21'	20'	20'	-	-	-	-	-	20'
(e) Pocket and wing:										
1. Pocket	15'	-	-	-	-	-	-	22'	40'	20'
2. Wing	15'	-	-	-	-	-	-	10'	10'	20'
15. Roof bolting - concurrent or subsequent to face mining?	Concurrent	-	Concurrent	Subsequent	Concurrent	-	Concurrent	Subsequent	Subsequent	Subsequent
(a) Timbering concurrent or subsequent to face mining?	do.	Concurrent	do.	Concurrent	do.	-	do.	Concurrent	Concurrent	Concurrent
16. Roof-support development:										
(a) Bolts	Bolts	-	Bolts	Bolts	Bolts	-	Bolts	Bolts	Bolts	-
(b) X-bars	X-bars	X-bars	-	X-bars	X-bars	-	X-bars	-	X-bars	X-bars
(c) Posts	-	Posts	-	-	Posts	-	Posts	Posts	Posts	-
(d) Bolts and x-bars	Bolts - X-bars	-	Bolts - X-bars	-	Bolts - X-bars	Bolts - X-bars	-	-	Bolts - X-bars	-
(e) Bolts and posts	-	-	Bolts - Posts	Bolts - Posts	Bolts - Posts	Bolts - Posts	Bolts - Posts	Bolts - Posts	-	-
(f) Self-supporting	-	-	-	-	-	-	-	-	-	-
17. Roof support - retreat mining:										
(a) Bolts	Bolts	-	-	Bolts	-	-	Bolts	-	-	-
(b) X-bars	X-bars	X-bars	-	-	X-bars	-	X-bars	-	X-bars	X-bars
(c) Posts	-	Posts	-	Posts	Posts	Posts	Posts	Posts	Posts	-
(d) Bolts and x-bars	Bolts - X-bars	-	-	-	-	-	Bolts - X-bars	-	-	-
(e) Bolts and posts	Bolts - Posts	-	Bolts - Posts	-	-	Bolts - Posts	Bolts - Posts	-	-	-
(f) Self-supporting	-	-	-	-	-	-	-	-	-	-
18. Roof-bolt anchorage:										
(a) Massive rock	-	-	-	Massive rock	Rock	Massive rock	Rock	Massive rock	Massive rock	-
(b) Laminated shale	Laminated Shale	Shale	Shale	Shale	Shale	Shale	Shale	-	-	-
(c) Coal		-	-	-	-	-	-	-	-	-
(d) Other		-	-	-	-	-	-	-	-	-
19. Do you have a standard roof-support plan?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20. If available, attach a roof-support plan	No	No	No	No	Yes	Yes	No	No	No	No
21. What percentage of accidents occurred from falls of roof, sides or face?										
1955	10	25	33	38	33	16	21	8.64	20	20
1956	No roof-fall accidents	33	28	21.5	14	20	18	8.47	15	25
22. What percentage of roof-fall accidents occurred within 25 ft. of working face?										
1955	100	50	100	75	75	100	7	57	100	50
1956	0	0	100	40	100	100	0	60	100	57
23. What percentage of roof-fall accidents occurred where roof-support plan was not followed?										
1955	0	50	100	0	16.6	8	0	0	0	0
1956	0	25	0	0	25	13	0	0	0	0
24. Where roof supports are used, what percentage of roof-fall accidents occurred inby last roof support?										
1955	100	25	100	75	16.6	90	0	57	100	50
1956	-	0	0	40	25	93	0	40	75	57
25. What percentage of roof fall accidents occurred in -										
(a) Advance or development mining -										
1955	0	50	0	100	33	75	100	25	100	0
1956	0	50	0	100	0	30	79	40	100	0
(b) Pillar or retreat mining -										
1955	100	50	100	0	67	25	0	75	0	100
1956	0	50	100	0	100	70	21	60	0	
26. What percentage of roof-fall accidents occurred in the following areas:	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956
(a) Roof-bolted area	0 0	0 0	0 100	75 40	- -	- -	33 33	0 40	75 75	0 0
(b) Timbered area	100 0	100 100	100 0	0 0	- -	- -	33 33	100 60	25 25	100 100
(c) Combination timber and roof bolts	0 0	0 0	0 0	25 60	- -	- -	34 34	0 0	0 0	0 0
(d) Self-supporting roof	0 0	0 0	0 0	0 0	- -	- -	0 0	0 0	0 0	0 0

1. State	West Virginia	West Virginia	Alabama	Alabama	Pennsylvania	Pennsylvania	West Virginia	West Virginia
2. Mine	"N1"	"N2"	"N3"	"N4"	"N5"	"N6"	"N7"	"N8"
3. Coal seam	Pocahontas #4	Pocahontas #4	Pratt	Pratt	Pittsburgh	Pittsburgh	Eagle and Powellton	Pocahontas #3
4. Thickness of coal seam	78"	72"	60"	72"	68" to 70"	94"	30" to 108"	44"
5. Immediate top	Shale or sandstone	Shale or sandstone	Shale to sandstone	Shale and sandstone	Roof coal shales	Soft shales and slate	Gray shale to sandstone	Slate and sandstone
6. Secondary top	Sandstone	Sandstone	Shale and sandstone	do.	Wild coal shales	Shale with coal	Sandstone	Sandstone
7. Type of bottom	Sandstone or fireclay	Sandstone or fireclay	Shale	Shale	Fireclay	Fireclay	Gray shale-Fireclay	Slate
8. Overburden:								
(a) Maximum	1,600'	1,600'	600'	650'	650'	400'	985'	Unknown
(b) Minimum	600'	600'	500'	200'	450'	200'	0'	20'
(c) Average	1,100'	100'	560'	400'	550'	300'	445'	525'
9. System of mining	Room-and-pillar	Room-and-pillar	Room-and-pillar	Room-and-pillar	Block	Block	Room-and-pillar	Room-and-pillar
10. What percentage of coal is mined on development or advance work?	40	40	50	45	28	28	50	
11. Size of pillars in:								
(a) Entries	57' x 72'	57' x 72'	50' x 54'	50' x 60'	98' x 98'	98' x 98'	40' x 57'	Vary
(b) Rooms	57' x 72'	57' x 72'	46' x 54'	50' x 60'	96' x 96'	96' x 96'	50' x 50'	55' x 55'
(c) Retreat mining	57' x 72'	57' x 72'	-	-	96' x 96'	96' x 96'	80' x 80'	Vary
12. On what centers are:								
(a) Entries	75' and 90'	75' and 90'	70'	75'	112'	112'	60'	75'-80'-100'
(b) Rooms	Same	Same	70'	75'	112'	112'	75'	75'
(c) Breakthroughs	Same	Same	70'	86.6'	112'	112'	75'	75'-80'-95'
(d) Pillar mining	Same	Same	-	-	112'	112'	100'	-
13. Pillar mining:								
(a) Complete extraction	Complete extraction	Complete extraction	Complete extraction	Complete extraction	Complete extraction	Complete extraction	Complete extraction	Complete extraction
(b) Partial extraction	-	-	-	-	-	-	-	-
14. Width of places:								
(a) Entries	18'	18'	20'	22' to 24'	14'	14'	14' - 22'	20'
(b) Rooms	18'	18'	22' - 24'	22' to 24'	16'	16'	20' - 25'	20'
(c) Breakthroughs	18'	18'	16'	16' to 18'	14'	14'	14' - 18'	20'
(d) Open-end cutovers	18'	18'	-	20'	20'	20'	20'	17' and 20'
(e) Pocket and wing:								
1. Pocket	-	-	-	-	18'	18'	-	-
2. Wing	-	-	-	-	8'	8'	-	-
15. Roof bolting - concurrent or subsequent to face mining?	Subsequent	Subsequent	Concurrent	-	Concurrent	Concurrent	Concurrent	Concurrent and subsequent
(a) Timbering concurrent or subsequent to face mining?	Concurrent	Concurrent	do.	Concurrent	do.	do.	do.	do.
16. Roof-support development:								
(a) Bolts	Bolts	Bolts	Bolts	Bolts	Bolts	Bolts	Bolts	Bolts
(b) X-bars	X-bars	X-bars	X-bars	-	X-bars where necessary	X-bars where necessary	X-bars	X-bars
(c) Posts	-	-	Intersections	Posts	Posts where necessary		Posts	Posts
(d) Bolts and x-bars	Bolts - X-bars	Bolts - X-bars	Bolts - X-bars	-	-	Bolts - Posts	Bolts - X-bars	-
(e) Bolts and posts	Bolts - Posts	Bolts - Posts	Bolts - Posts	-	-	-	Bolts - Posts	-
(f) Self-supporting	-	-	-	-	-	-	Self-supporting	-
17. Roof support - retreat mining:								
(a) Bolts	-	-	-	-	-	-	-	-
(b) X-bars	X-bars	X-bars	-	X-bars	X-bars	X-bars	X-bars	X-bars
(c) Posts	Posts	Posts	-	Posts	Posts - Cribs	Posts - Cribs	Posts	Posts
(d) Bolts and x-bars	Bolts - X-bars	-	-	-	-	-	-	-
(e) Bolts and posts	Bolts - Posts	Bolts - Posts	Bolts - Posts	-	-	-	-	-
(f) Self-supporting	-	-	-	-	-	-	-	-
18. Roof-bolt anchorage:								
(a) Massive rock	Massive rock	Massive rock	Massive rock	Massive rock	Laminated shale	Laminated shale	Massive rock	Massive rock
(b) Laminated shale	Shale	Shale	Shale	Shale	-	-	-	-
(c) Coal	-	-	-	-	-	-	-	-
(d) Other	-	-	-	-	-	-	-	Other
19. Do you have a standard roof-support plan?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20. If available, attach a roof-support plan	Yes	Yes	No	No	No	No	Yes	Yes
21. What percentage of accidents occurred from falls of roof, sides, or face?								
1955	18	1.9	20	12.5	9	None	20	14.6
1956	27.2	22	100	25	10	None	29	10
22. What percentage of roof fall accidents occurred within 25 ft. of working face?								
1955	50	100	0	100	40	0	13	43.47
1956	57	62	100	100	55	0	23	66.33
23. What percentage of roof-fall accidents occurred where roof-support plan was not followed?								
1955	40	0	0	0	None	0	8	4.3
1956	14	12.5	0	0	None	0	0	11.11
24. Where roof supports are used, what percentage of roof-fall accidents occurred inby last roof support?								
1955	60	0	0	100	-	0	8	-
1956	28	25	0	100	44	0	27	-
25. What percentage of roof-fall accidents occurred in -								
(a) Advance or development mining -								
1955	40	100	0	0	10	0	75	39.13
1956	14	25	100	0	22	0	45	38.89
(b) Pillar or retreat mining -								
1955	40	0	0	100	40	0	25	60.86
1956	43	37.5	0	100	55	0	55	61.11
26. What percentage of roof-fall accidents occurred in following areas?	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956	1955 1956
(a) Roof-bolted area	40 43	0 50	80 0	0 0	- 12	0 0	0 0	0 0
(b) Timbered area	60 57	100 38	20 100	100 100	100 88	0 0	92 82	100 94.45
(c) Combination timber and roof bolts	0 0	0 12	0 0	0 0	- -	0 0	0 18	0 5.55
(d) Self-supporting roof	0 0	0 0	0 0	0 0	- -	0 0	8 0	0
27. Do you consider roof-control plan or method adequate; if not, what do you recommend?								

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